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INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR NELLIS AIR --ETC(U)
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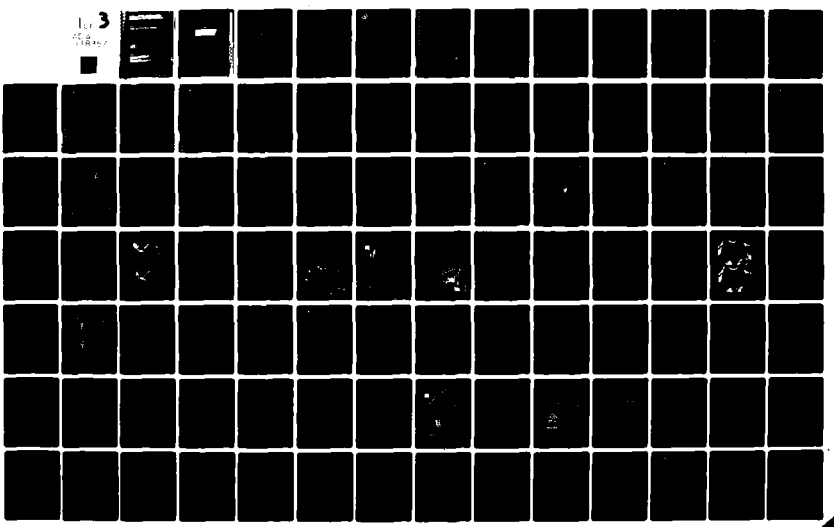

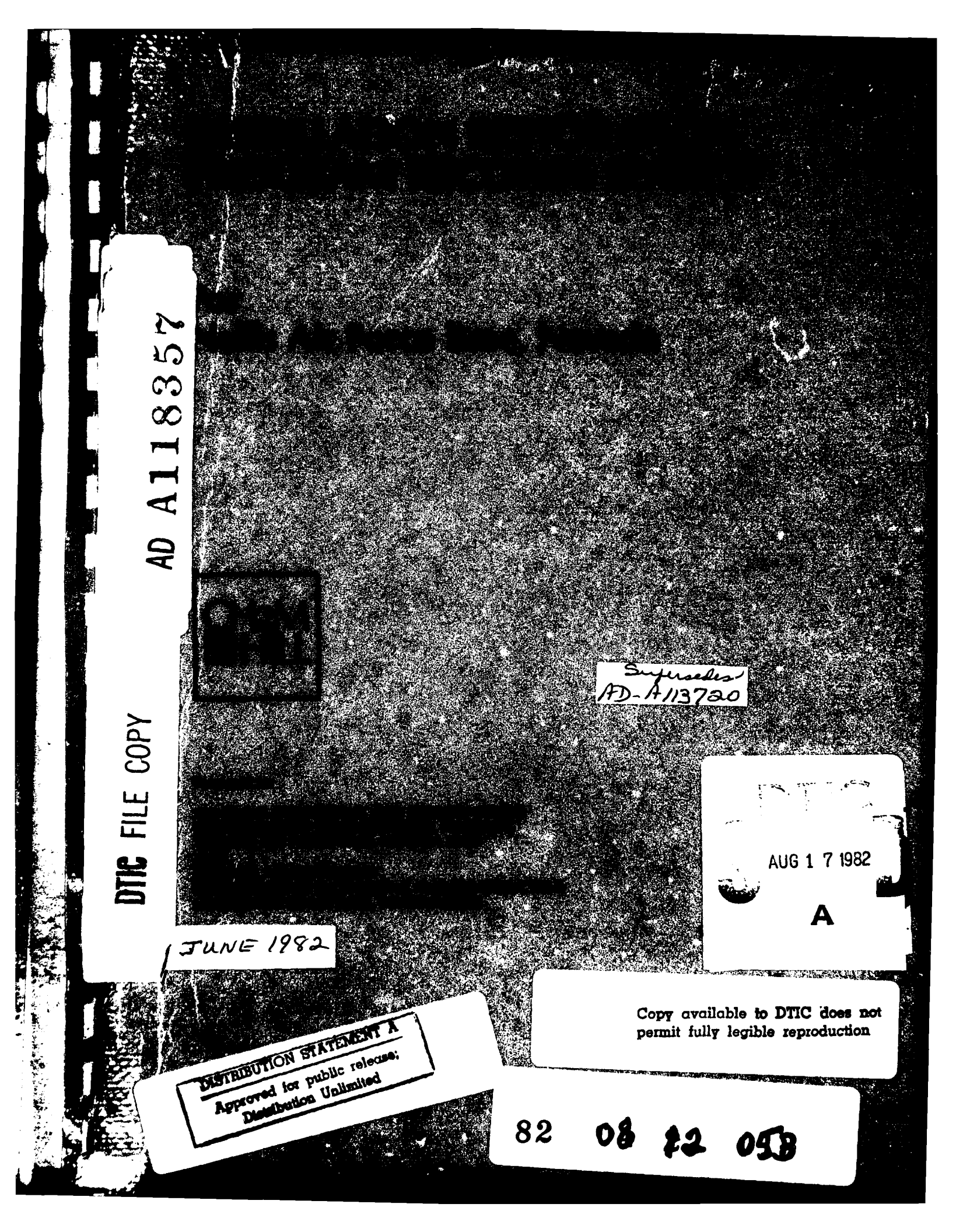

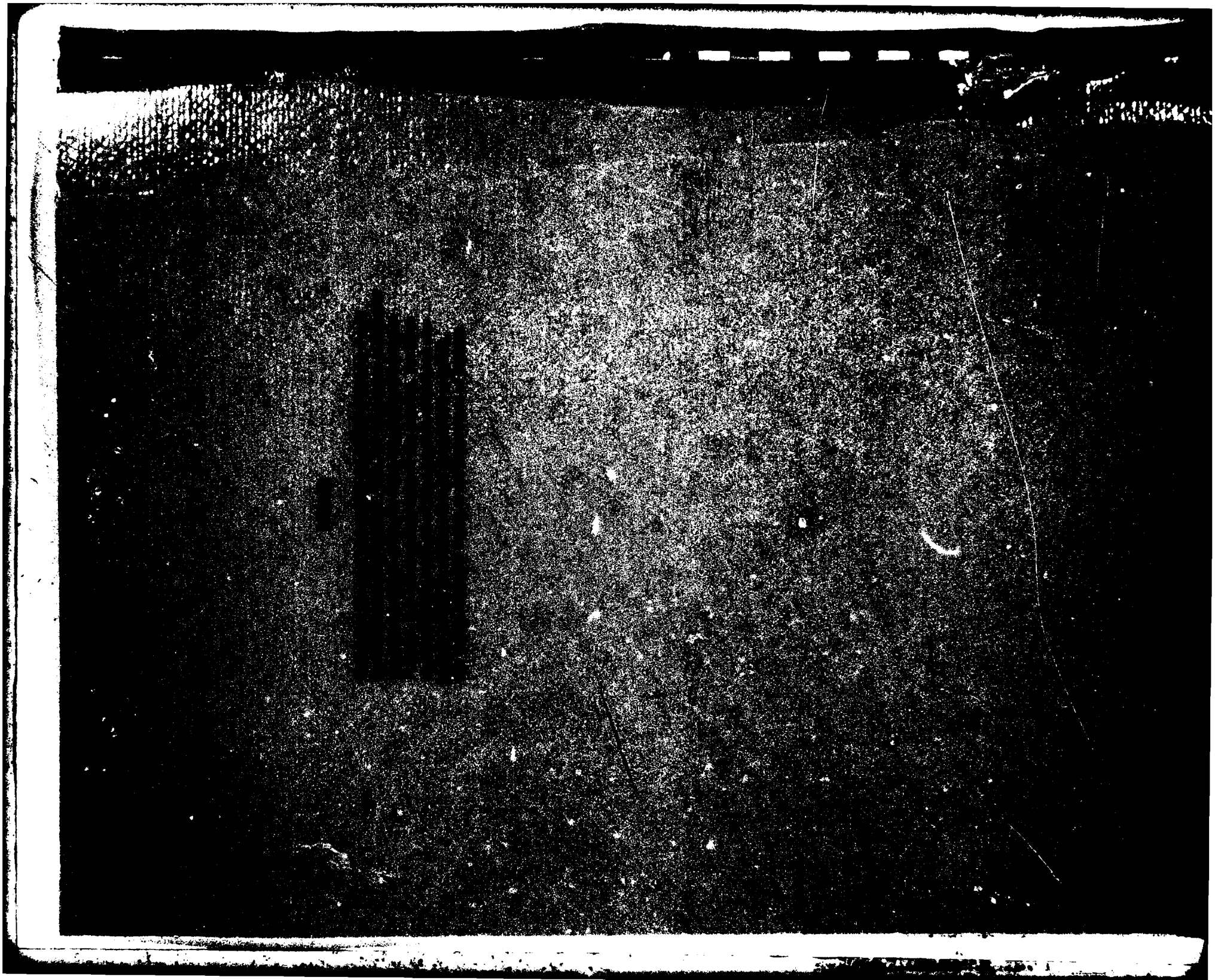

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS TACTICAL AIR COMMAND
LANGLEY AIR FORCE BASE, VA 23665

REPLY TO ATTN OF: DEEV

1382

SUBJECT: Installation Restoration Program (IRP) Records Search, Nellis AFB

TO: See Distribution

1. We provided your office with copies of the subject report on or about 20 Apr 82. This study used a site rating model developed in Jun 1981 to identify the potential for contamination resulting from past disposal practices. On 26-27 Jan 82, representatives of USAF OEHL, AFESC, several major commands, Engineering Science, and CH2M Hill met at our office to develop an improved rating system. The new rating model, Hazardous Assesment Rating Methodology (HARM), is now used for all Air Force IRP studies. To maintain consistency, AFESC had their on-call contractors review their phase I studies performed before the advent of HARM and provide two additional appendices. The new appendices address the background of the HARM system and evaluate each of the phase I sites using the Jan 82 rating methodology.

2. Enclosed are copies of the added appendices for the Installation Restoration Program (IRP) Records Search at Nellis AFB. Request you attach these appendices to the phase I reports we provided you in APR 82.

3. For AFRCE-WR: Request you distribute copies of the new appendices to the Regional Environmental Protection Agency and Nevada Department of Conservation and Natural Resources, Division of Environmental Protection.

4. For DTIC: Request you integrate the enclosed appendices with the Installation Restoration Program Records Search for Nellis AFB into the National Technical Information System (NTIS). The report and new appendices are approved for public release with unlimited distribution. ✓

5. Our project officer for IRP is Mr. Burnet, A/V 432-4430.

FOR THE COMMANDER

George C. Windrow

GEORGE C. WINDROW
Actg Dir of Eng & Env Plng

1 Atch
Appendices

Readiness is our Profession

(1)

INSTALLATION RESTORATION PROGRAM RECORDS SEARCH

For

NELLIS AIR FORCE BASE, NEVADA

Prepared for

AIR FORCE ENGINEERING AND SERVICES CENTER
DIRECTORATE OF ENVIRONMENTAL PLANNING
TYNDALL AIR FORCE BASE, FLORIDA 32403
and
TACTICAL AIR COMMAND
DIRECTORATE OF ENGINEERING AND CONSTRUCTION
LANGLEY AIR FORCE BASE, VIRGINIA 23665

By

CH2M HILL
Gainesville, Florida

June ~~April~~ 1982

Contract No. F08637 80 G0010 0006

NOTICE

This report has been prepared for the United States Air Force By CH2M HILL SOUTHEAST, INC., for the purpose of aiding in the implementation of the Air Force Installation Restoration Program. It is not an endorsement of any product. The views expressed herein are those of the contractor and do not necessarily reflect the official views of the publishing agency, the United States Air Force, or the Department of Defense.

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ACRONYMS, ABBREVIATIONS, AND SYMBOLS

ACRONYMS, ABBREVIATIONS, AND SYMBOLS

AFAF	Air Force Auxiliary Field
AFB	Air Force Base
AFESC	Air Force Engineering and Services Center
AGE	Aerospace Ground Equipment
AMU	Aircraft Maintenance Unit
ANG	Air National Guard
AVGAS	Aviation gasoline
BLM	Bureau of Land Management
BOD	Biochemical oxygen demand
CE	Civil Engineering
CES	Civil Engineering Squadron
COD	Chemical oxygen demand
DESEP	Civil Engineering/Environmental Planning
DOD	Department of Defense
DPDO	Defense Property Disposal Office
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
°F	Degrees Fahrenheit
FAA	Federal Aviation Administration
ft	Foot (feet)
gpd	Gallons per day
IRP	Installation Restoration Program
Max.	Maximum
MEK	Methyl ethyl ketone
Min.	Minimum
MOGAS	Motor gasoline
NPDES	National Pollutant Discharge Elimination System
No.	Number
OEHL	Occupational and Environmental Health Laboratory
PD-680	Safety solvent (petroleum distillate)
PCBs	Polychlorinated biphenyls

POL	Petroleum, oil, and lubricants
RCRA	Resource Conservation and Recovery Act
RED HORSE	Rapid Emergency Deployable Heavy Operational Repair Structural Engineering
STP	Sewage treatment plant
TAC	Tactical Air Command
TCE	Trichloroethylene
TDS	Total dissolved solids
TFWC	Tactical Fighter Weapons Center
TOC	Total organic carbon
USAF	United States Air Force
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

EXECUTIVE SUMMARY

A. INTRODUCTION

1. CH2M HILL was retained by the Air Force Engineering and Services Center (AFESC) on 10 August 1981 to conduct the Nellis AFB Records Search under Contract No. F08637-80-G0010-0006, using funding provided by the Tactical Air Command (TAC).

2. The Department of Defense (DOD) policy was directed by Defense Environmental Quality Program Policy Memorandum (DEQPPM) 81-5 dated 11 December 1981 and implemented by Air Force message dated 21 January 1982 as a positive action to ensure compliance of military installations with existing environmental regulations. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program. The purpose of DOD policy is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DOD facilities, to control the migration of hazardous contamination, and to control hazards to health and welfare that resulted from these past operations.

3. To implement the DOD policy, a four-phase Installation Restoration Program has been directed. Phase I, the records search phase, is the identification of potential problems. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase IIa consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants. If the Phase IIa

work confirms the presence and/or migration of contaminants, then Phase IIb field work would be conducted to determine the extent and magnitude of the contaminant migration. Phase III (not part of this contract) consists of a technology base development study to support the development of project plans for controlling migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

4. The Nellis AFB Records Search included a detailed review of pertinent installation records, contacts with 30 outside agencies for documents relevant to the records search effort, a pre-on-site coordination visit, and an on-site base visit conducted by CH2M HILL during the week of 14 to 18 December 1981. An outbriefing was held with the Deputy Base Civil Engineer, Mr. Lujan, to discuss the purpose of the site visit and to present the major findings. Activities conducted during the on-site base visit included a review of the installation records, interviews with 48 past and present base employees and ground and aerial tours of the facilities. USAF TFWC Complex activities were not included in the scope of this project. Installations included in the Records Search Program were:

a. Nellis AFB including Area II and Area III
b. Indian Springs Air Force Auxiliary Field (AFAF)
c. Nellis AFB Small Arms Range Annex
d. Water Systems Annex
e. Apex Obstruction Light Annex
f. Beatty Recreation Annex
g. Nellis AFB Communications Annex
h. Mt. Sunrise Obstruction Light Annex

5. Potentially contaminated sites were rated using a modification of the hazard rating system developed by JRB Associates, Inc. The system was modified by the Air Force, CH2M HILL, and Engineering Science. The methodology used to identify the potentially contaminated sites included a review of base industrial activities, past waste management practices, and field investigations. If no hazardous waste contamination seemed likely at a particular site, it was deleted from further consideration. At those sites where contamination was likely, a decision was made on whether the contaminants could migrate. If not, critical environmental concerns were presented to base personnel for appropriate action. If so, the site was rated and prioritized.

6. Should the records search indicate that the potential exists for migration of hazardous contaminants, Phase II field work would be indicated to confirm the presence of the specific migrating contaminants and to determine the extent of migration. Restoration or containment of the hazardous waste disposal sites would comprise Phase IV of the Installation Restoration Program.

B. FINDINGS

Nellis AFB (including Areas II and III)

1. No direct evidence was found to indicate that migration of hazardous contaminants beyond the Nellis AFB boundaries exists. High nitrate levels were observed in a USGS well located down-gradient from the abandoned sewage treatment percolation ponds (Site No. 17). The presence of private septic

systems near the well may influence the nitrate levels, or lateral migration of sewage effluent may have occurred in the past.

2. Information obtained through interviews with 48 past and present base personnel and through field observation indicates that hazardous wastes have been disposed of on Air Force property at Nellis AFB.

3. Industrial activity at Nellis AFB consists primarily of routine vehicle, aircraft, and ground support equipment maintenance. Nellis AFB is one of the largest Tactical Air Command bases, and a relatively high number of aircraft are stationed there. Generation of large quantities of hazardous wastes has not occurred, in comparison to bases having significant aircraft rework and maintenance missions. The potential for a large-scale contamination problem is considered to be low.

Nellis AFB Small Arms Range Annex

4. No direct evidence was found to indicate that migration of hazardous contaminants beyond the Nellis AFB Small Arms Range property boundaries exists.

5. Information obtained through the interviews with past and present base personnel and through field observation indicates that small quantities of hazardous wastes have been disposed of on the small arms range.

Indian Springs AFAF

6. No direct evidence was found to indicate that migration of hazardous contaminants beyond the Indian Springs AFAF boundaries exists.

7. Information obtained through interviews with past and present Nellis AFB and Indian Springs AFAF personnel and through field observation indicates that small quantities of hazardous wastes have been disposed of on Air Force property at Indian Springs AFAF.

8. Industrial activity at Indian Springs consists primarily of routine vehicle and aircraft maintenance. Activity levels are much lower now than in the past, but the quantities of hazardous wastes generated have always been much less than at Nellis AFB. The potential for a large-scale contamination problem is low.

Other Off-Base Facilities

9. No records or interviews indicated that hazardous waste disposal activities or spills occurred at any of the other off-base facilities.

C. CONCLUSIONS

Nellis AFB (including Areas II and III)

1. Low precipitation, high evaporation, the absence of major surface waters, and moderately deep groundwater levels limit the possible pathways for hazardous contaminant migration at Nellis AFB. The sand

and gravel content of the sediments underlying the base is low, and therefore the permeability is low. Subsidence fissures could provide direct pathways for migration of contaminants to the groundwater, but no evidence of such fissuring was discernible near any disposal areas. The potential for significant hazardous contaminant migration is low.

2. Table V-1 presents a priority listing of the rated sites. One general area has been identified as having the highest potential for environmental concern. This area consists of a major base landfill (Site No. 1), the STP percolation ponds (Site No. 17), the fuel tank sludge disposal area (Site No. 24), and the storm drain (Site No. 15). The storm drain could act as a driving force for contaminant migration.

3. The remaining sites at Nellis AFB are not considered to present significant environmental concerns. This includes the base landfill (Site No. 3), which is partially on BLM and private land. The quantity of hazardous waste disposed of in this site is low, and the migration pathways are negligible.

Nellis AFB Small Arms Range Annex

4. Low precipitation, high evaporation, the absence of major surface waters, moderately deep groundwater levels, and the remoteness of the area limit the possible pathways for hazardous contaminant migration at the small arms range. The soils are similar to those underlying Nellis AFB, and their permeability is low. The potential for significant hazardous contaminant migration at all the sites is low.

5. Property proposed to be excessed includes part of one landfill (Site No. 2), all of another landfill (Site No. 1), and the possible radioactive waste disposal area (Site No. 5). Potentially hazardous industrial wastes have been disposed of in both of the landfills. Migration of hazardous contaminants beyond the immediate vicinity of the landfills is not likely.

Indian Springs AFAF

6. Low precipitation, high evaporation, the absence of major surface waters, and moderately deep groundwater levels limit the possible pathways for hazardous contaminant migration at Indian Springs AFAF. Groundwater movement is to the north into the USAF TFWC Complex. The potential for significant hazardous contaminant migration beyond the boundaries of Indian Springs AFAF is low, and the potential for contaminant migration off Air Force property is negligible.

D. RECOMMENDATIONS

Nellis AFB (including Areas II and III)

1. A limited monitoring program is suggested to confirm the absence of hazardous contaminant migration. Significant health hazards have not been identified, and no urgent need for the monitoring program exists. The priority for monitoring at Nellis AFB is considered moderate.

2. Monitoring is suggested for the disposal area south of the golf course consisting of Sites No. 1, 17,

24, and 15, as described in paragraph 2 of the conclusions. Two groundwater monitoring wells should be installed down-gradient from the area along the southern base perimeter, and a background water quality monitoring well should be installed north of the golf course. Based on the available information, the wells should be 50 to 100 feet deep. Samples from these three wells plus the existing USGS monitoring well discussed in Section III and the existing base water well south of the golf course should be analyzed for volatile organic compounds (TCE, MEK), gross contaminants (TOC, COD, oil and grease, pH, specific conductance, nitrate), heavy metals (chromium, lead, cadmium, silver) and pesticides (DDT).

Nellis AFB Small Arms Range Annex

3. Groundwater monitoring for hazardous contaminant migration is not considered necessary at the small arms range. The potential for large scale contamination or contaminant migration at all of the sites is negligible.

Indian Springs AFAF

4. Hazardous contaminant migration is not indicated at Indian Springs AFAF, and no Phase II monitoring is recommended.

Other Off-Base Sites

5. Hazardous contamination or contaminant migration is not indicated at any of the other off-base sites, and no Phase II monitoring is recommended.

Items Referred to the Base Environmental Program

1. Nellis AFB (including Areas II and III)

   a. The presence of the California desert poppy (Arctomecon californica) in the base landfill (Site No. 2) should be confirmed.

   b. The cause of the continuous flow in the storm drain (Site No. 15) should be verified and stopped to remove this potential driving force for contaminant migration. Measures should be taken to prevent unauthorized waste dumping into the drain.

   c. Measures should be taken to prevent unauthorized dumping in the burial pits (Sites No. 5, 6 and 8).

   d. The condition of the liquid radioactive waste holding tank (Site No. 21) should be determined.

2. Nellis AFB Small Arms Range

   a. Surface radioactivity level measurements should be made along the road leading north from the range (Site No. 5) to confirm if such wastes were disposed of in the area.

Specific details of the limited Phase II program outlined above should be finalized during the initial stages of Phase II. It is not the intent of Phase I to assess the exact location or depth of any groundwater monitoring wells. In the event that contaminants are detected in the water samples collected from any of the wells, a follow-on field survey program should be implemented to determine the extent of the contaminant migration. The Phase II contractor should

be responsible for evaluating the results of the program outlined above and for recommending additional monitoring, as appropriate.

I. INTRODUCTION

A. BACKGROUND

The primary legislation governing the management and disposal of solid waste is the Resource Conservation and Recovery Act (RCRA) of 1976. Regulations and implementing instructions for the Act are continuing to be developed by EPA. Under RCRA Section 3012 (Public Law 96-482, 21 October 1981) each state is required to inventory all past and present hazardous waste disposal sites. Section 6003 of RCRA requires Federal agencies to assist EPA and make available all requested information on past disposal practices. It is the intent of the Department of Defense (DOD) to comply fully in these as well as other requirements of RCRA. The DOD devised a comprehensive Installation Restoration Program (IRP) to identify, report, and correct environmental deficiencies from past disposal practices that could result in environmental contamination and probable migration of contaminants. In response to RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund), the DOD issued Defense Environmental Quality Program Policy Memorandum 81-5 (DEQPPM 81-5) on 11 December 1981, which was implemented by Air Force message dated 21 January 1982. DEQPPM 81-5 reissued and amplified all previous directives and memoranda on the Installation Restoration Program.

To conduct the Installation Restoration Program Records Search for Nellis AFB, the AFESC retained CH2M HILL on 10 August 1981 under Contract No. F08637-80-G0010-0006 using funding provided by the Tactical Air Command (TAC). USAF TFWC Complex activities are not included within the scope of this project.

The facilities included in the records search are as follows (Figure 1):

1. Nellis AFB including Area II and Area III

2. Indian Springs Air Force Auxiliary Field (AFAF)

3. Nellis AFB Small Arms Range Annex

4. Water Systems Annex

5. Apex Obstruction Light Annex (no on-site investigation)

6. Beatty Recreation Annex (no on-site investigation)

7. Nellis AFB Communications Annex (no on-site investigation)

8. Mt. Sunrise Obstruction Light Annex (no on-site investigation)

The Records Search comprises Phase I of the IRP and is intended to review installation records to identify possible hazardous waste contaminated sites and potential problems that may result in contaminant migration. Phase II (not part of this contract) consists of follow-on field work as determined from Phase I. Phase IIa consists of a preliminary survey to confirm or rule out the presence and/or migration of contaminants. If the Phase IIa work confirms the presence and/or migration of contaminants, then Phase IIb field work would be conducted to determine the extent and magnitude of the contaminant migration. Phase III (not part of this contract) consists of a technology base development study to support the development of project plans for controlling

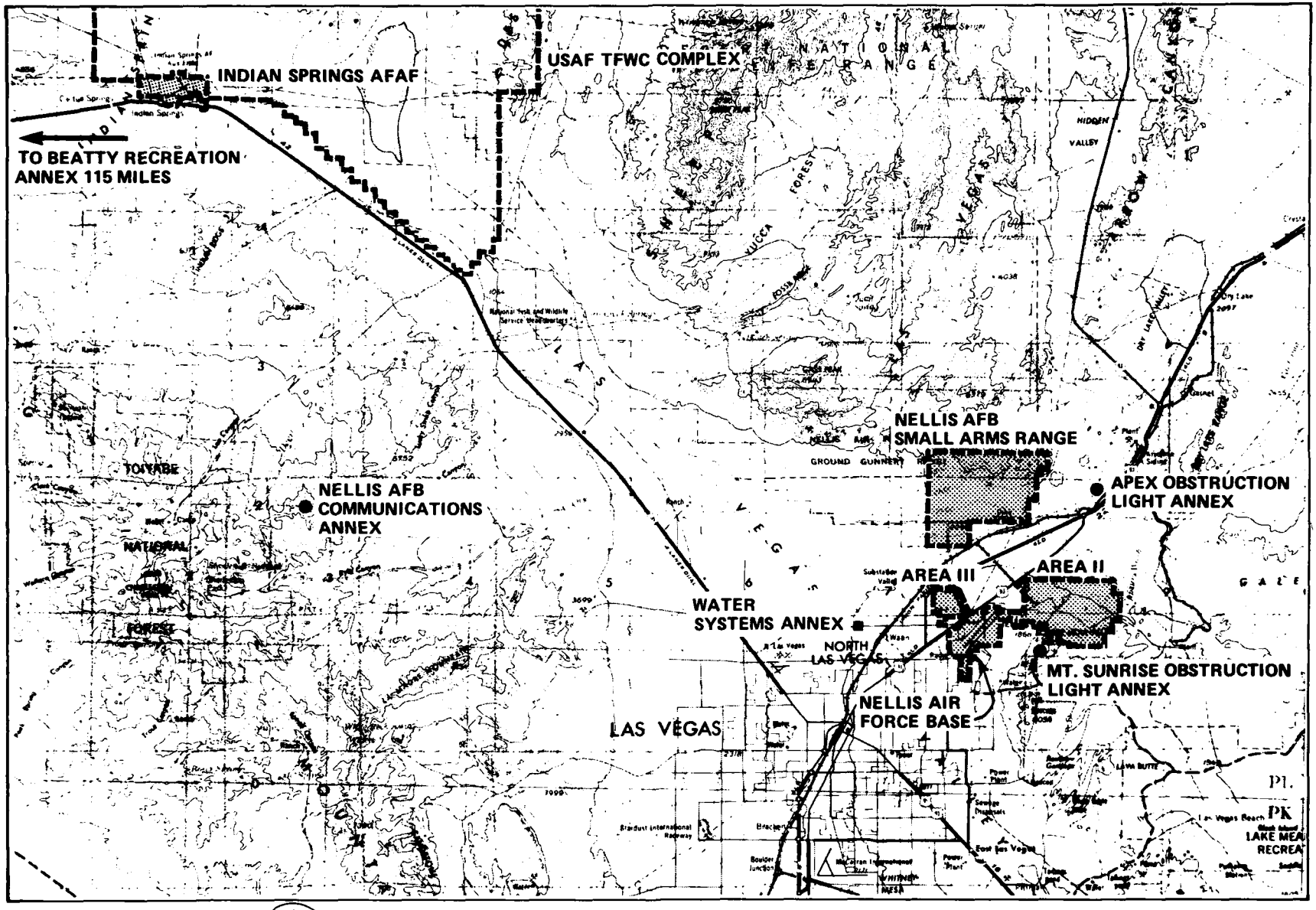


FIGURE 1
NELLIS AFB PROPERTIES

migration or restoring the installation. Phase IV (not part of this contract) includes those efforts which are required to control identified hazardous conditions.

B. AUTHORITY

Identification of hazardous waste disposal sites at military installations was directed by Defense Environmental Quality Program Policy Memorandum 81-5 (DEQPPM 81-5) dated 11 December 1981, and implemented by Air Force message dated 21 January 1982 as a positive action to ensure compliance of military installations with existing environmental regulations.

C. PURPOSE OF THE RECORDS SEARCH

DOD policy is to identify and fully evaluate suspected problems associated with past hazardous material disposal sites on DOD facilities, to control the migration of hazardous contamination, and to control hazards to health or welfare that resulted from those past operations. The potential for adverse impact was evaluated at Nellis AFB by reviewing the existing information, conducting interviews, and making a detailed analysis of installation records. Pertinent information involves the history of operations, the geological and hydrogeological conditions that may contribute to the migration of contaminants, and the ecological settings that indicate sensitive habitats or evidence of environmental stress resulting from contaminants.

D. SCOPE

The records search consisted of a pre-performance meeting, a pre-on-site base visit, an on-site base visit, a review and analysis of the information obtained, and preparation of this report.

The pre-performance meeting for Nellis AFB and others was held at Nellis AFB, Nevada, on 17, 18, and 19 August 1981. Representatives of the AFESC, USAF Occupational and Environmental Health Laboratory (OEHL), Tactical Air Command (TAC), Nellis AFB, and CH2M HILL attended this meeting. The objectives of this meeting were to provide detailed project instructions for the records search, to provide clarification and technical guidance by AFESC, and to define the responsibilities of all parties participating in the Nellis AFB records search. The pre-on-site visit was held on 7 and 8 December 1981 to gather additional record information and coodinate the base visit by the full project team.

The on-site base visit was conducted by CH2M HILL from 14 December through 18 December 1981. An outbriefing was held with the Deputy Base Civil Engineer, Mr. Lujan, to describe the purpose of the site visit and to present the major findings. Activities performed during the on-site base visit included a detailed search of installation records, ground and aerial tours of the installation, and interviews with 48 former and present base personnel. Thirty outside agencies (see Appendix B) were contacted for documents relevant to the Records Search effort. The following individuals were on the CH2M HILL records search team:

1. Mr. Michael Kemp, Project Manager (M.S., Civil and Environmental Engineering, 1978)

2. Mr. Steven Hoffman, Project Senior Consultant (B.S., Civil Engineering, 1971)

3. Mr. Fritz Carlson, Hydrogeologist (M.S., hydrology, 1974)

4. Ms. Jane Gendron, Ecologist (B.A., biology, 1976)

Resumes of these team members are included in Appendix A.

Individuals from the Air Force who participated in the Nellis AFB Installation Restoration Program included:

1. Mr. Bernard Lindenberg, AFESC, Program Manager, Phase I

2. Mr. Myron Anderson, AFESC, Assistant Program Manager, Phase I

3. Mr. Gil Burnet, TAC, Command Program Manager, Phase I

4. Mr. Jim McInerney, Nellis AFB, Investigation Coordinator, 554 CES/DESEP

5. Mr. Dean Daily, Nellis AFB, Base Environmental Engineer, 554 CES/DESEP

6. Capt. Wiley Taylor, Nellis AFB, Chief, Bioenvironmental Engineering

7. Major Gary Fishburn, USAF OEHL, Program Manager, Phase II

E. METHODOLOGY

The methodology used in the Nellis AFB records search is shown graphically in Figure 2. First, a review of past and present industrial operations was conducted at the base. Information was obtained from available records such as shop files and real property files, as well as interviews with past and present employees from the various operating areas of the base.

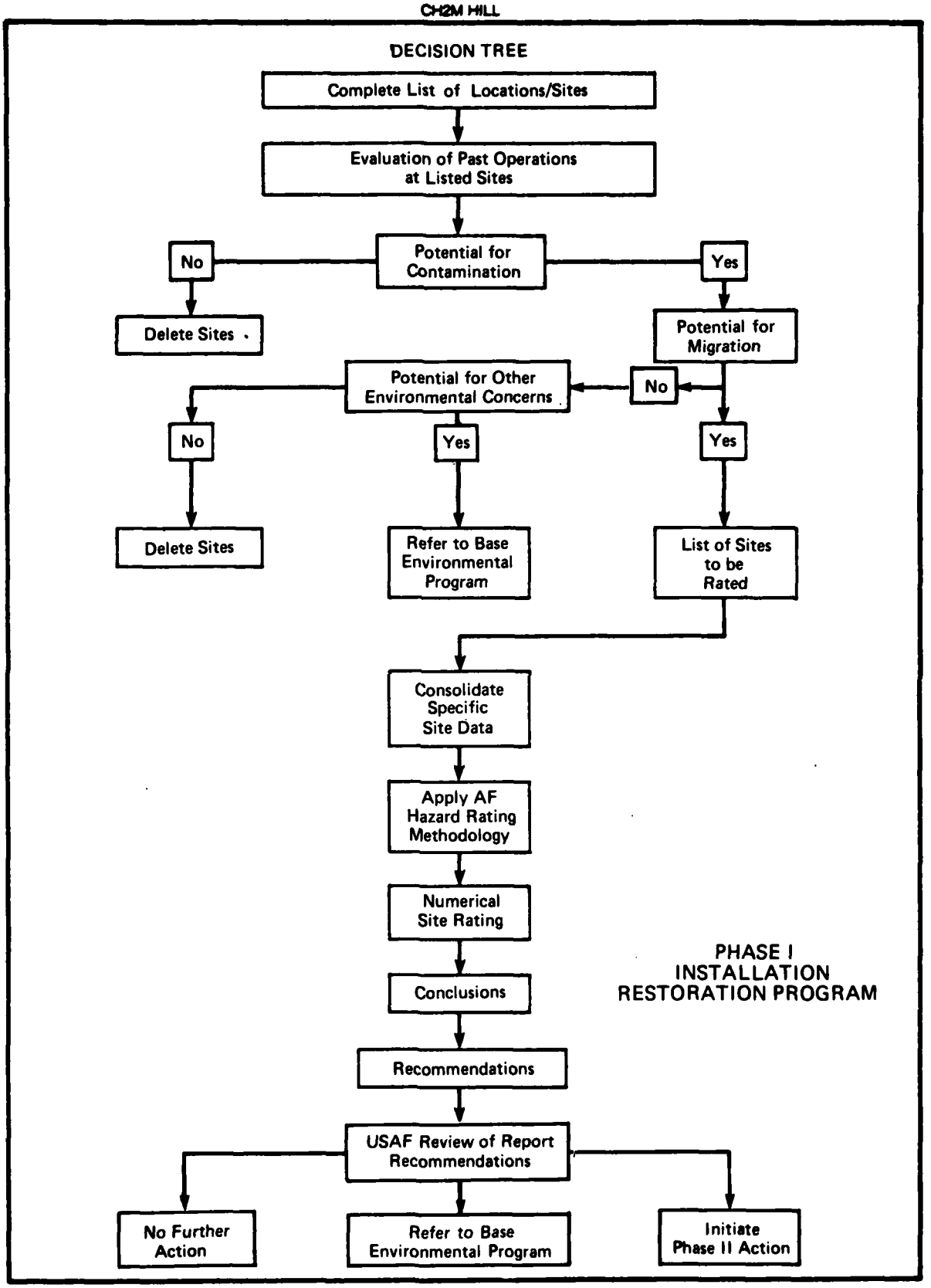


FIGURE 2
RECORDS SEARCH METHODOLOGY

The next step in the activity review process was to determine the past management practices regarding the use, storage, treatment, and disposal of hazardous materials from the various industrial operations on the base. Included in this part of the activities review was the identification of all past landfill sites and burial sites, as well as any other possible sources of contamination such as major PCB or solvent spills or fuel-saturated areas resulting from large fuel spills or leaks.

General ground and aerial tours of identified sites were made by the records search team to gather site-specific information including (1) evidence of environmental stress, (2) the presence of nearby drainage ditches or surface-water bodies, and (3) visual inspection of these water bodies for any obvious signs of contamination or leachate migration.

A decision was then made, based on all of the above information, whether a potential exists for hazardous material contamination in any of the identified sites. If not, the site was deleted from further consideration. If minor operations and maintenance deficiencies were noted during the investigations, the condition was reported to the Base Environmental Coordinator for remedial action.

For those sites where a potential for contamination was identified, a determination of the potential for migration of the contamination was made by considering site-specific soil and groundwater conditions. If there was no potential for contaminant migration, but other environmental concerns were identified, the site was referred to the base environmental monitoring program for further action. If no further environmental concerns were identified, the site was deleted from consideration. If the potential for contaminant migration was considered significant, then the site was rated and

prioritized using the site rating methodology described in Appendix H.

The site rating indicates the relative potential for environmental impact at each site. For those sites showing a high potential for adverse impact, recommendations are made to quantify the potential contaminant migration problem under Phase II of the Installation Restoration Program. For those sites showing a moderate potential for adverse impact, limited analyses may be desirable to confirm that a contaminant migration problem does not exist. For those sites showing a low potential of adverse impact, the site may be referred to the base environmental program or no Phase II work will be recommended.

II. INSTALLATION DESCRIPTION

A. LOCATION

Nellis AFB is located in the Great Basin area of southern Nevada, approximately 10 miles northwest of Lake Mead. The city of Las Vegas lies 8 miles southwest of the base, with the city of North Las Vegas lying between the base and Las Vegas. The base is located on the eastern edge of the Las Vegas Valley. The valley drains easterly to Lake Mead and the Colorado River via the Las Vegas Wash (see Figure 3).

USAF TFWC Complex activities were not included in the scope of this report. The facilities included in the records search were:

1. Nellis AFB including Area II (Lake Mead Base) and Area III (11,271 acres)

2. Indian Springs AFAF located approximately 40 miles northwest of Nellis AFB (2,300 acres)

3. Nellis AFB Small Arms Range Annex located 3 miles north of Nellis AFB (10,616 acres)

4. Water Systems Annex located on Craig Road approximately 5 miles west of Nellis AFB (107 acres)

5. Apex Obstruction Light Annex located approximately 8 miles northeast of Nellis AFB (0.1 acre)

6. Beatty Recreation Annex located at Beatty, Nevada, approximately 120 miles northwest of Nellis AFB (0.4 acre)

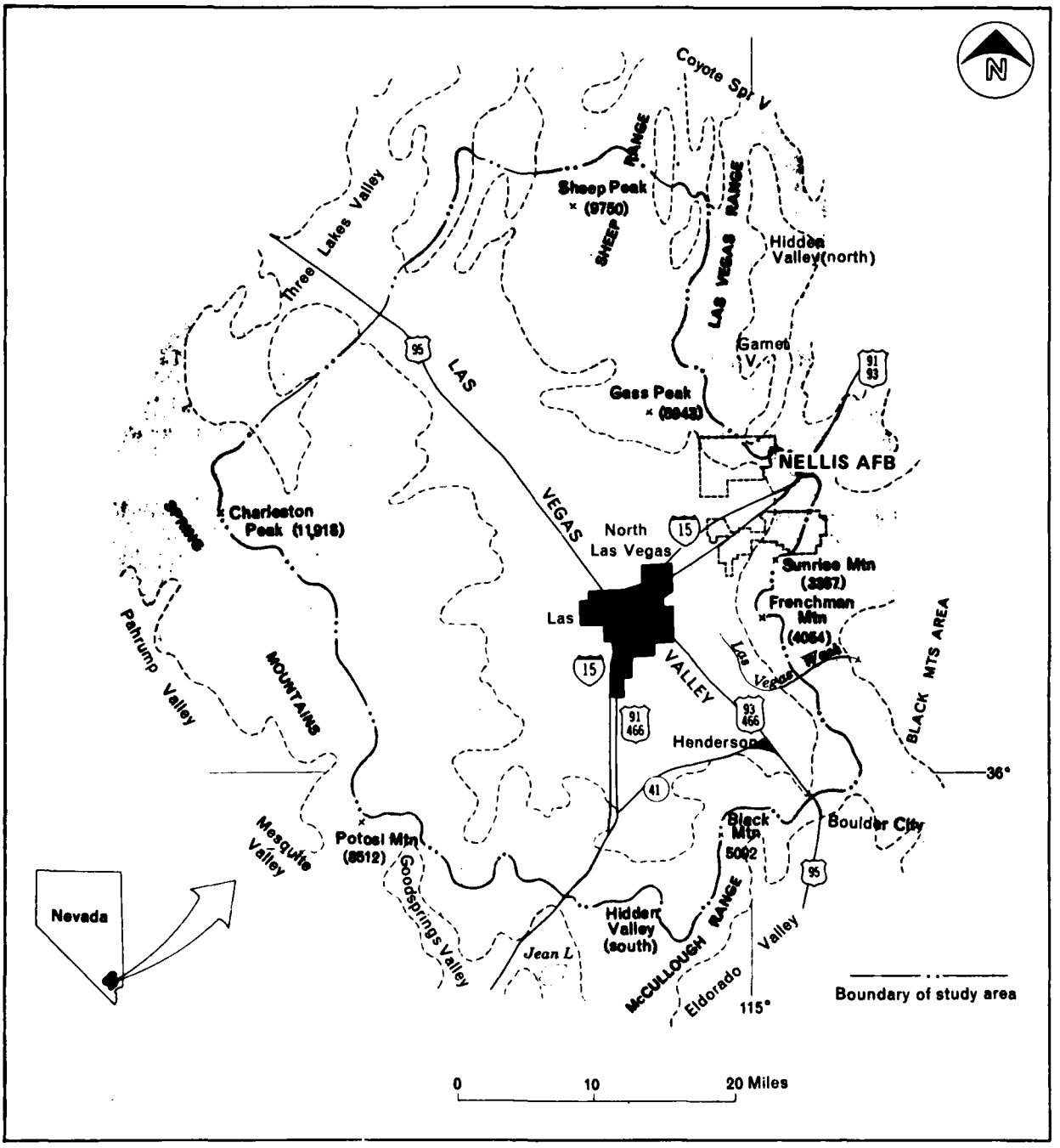


FIGURE 3
LOCATION AND GENERAL FEATURES OF STUDY AREA

7. Nellis AFB Communications Annex located on Angel Peak, approximately 30 miles west of Nellis AFB (1.7 acres)

8. Mt. Sunrise Obstruction Light Annex located approximately 3 miles east of Nellis AFB (136 acres)

The locations of these facilities are shown in Figure 1.

B. ORGANIZATION AND MISSION

An Air-to-Air Gunnery Training School was activated on the site of Nellis AFB in 1942. Fighter transition training was added in 1944 and continued until 1947 when the base was inactivated. In 1949, a USAF Aircraft Gunnery School was established. Since that time, Nellis AFB has served as a major center for weapons training, testing, and evaluation.

Nellis AFB hosts the USAF Tactical Fighter Weapons Center. The center develops tactics for weapons use and conducts operational tests and evaluations of new systems. Air crews and aircraft needed to conduct the tests are provided by the 57th Fighter Weapons Wing.

A more detailed discussion of the base history and mission is included in Appendix C.

III. ENVIRONMENTAL SETTING

A. METEOROLOGY

Nellis AFB is located in an extremely arid section of the Great Basin. Summers are long and hot and winters are short and cool. The midday relative humidity ranges from a low of 12 percent in June to a high of 35 percent in January. Annual average lake evaporation in the vicinity of Nellis AFB is 72 inches.

Annual precipitation at the base averages 3.8 inches and is evenly distributed throughout the year. The mean monthly temperature ranges from a low of 45 degrees F in January to a high of 91 degrees F in July. Surface winds exceeding 40 knots have occurred throughout the year but normally are less than 7 knots.

Table III-1 presents a summary of meteorological conditions at Nellis AFB.

B. GEOLOGY

The Las Vegas area, including Nellis Air Force Base, is located within the basin and range physiographic province. This province consists of desert basins flanked by mountain ranges. The Las Vegas Valley is bounded on the north by the Las Vegas Range and the Sheep Range (maximum elevation of 9750 feet), on the west by the Spring Mountains (maximum elevation 11,918 feet), on the east by the River Mountains (maximum elevation 4054 feet), and to the south by the McCullough Range (maximum elevation 5092 feet). Figure 3 shows the location and general features of the Las Vegas Valley. Nellis Air Force Base is located in the north-eastern portion of the Las Vegas Valley.

Table III-1
METEOROLOGICAL SUMMARY, NELLIS AFB, 1942 - 1981

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years of Record
Temperature (°F)														
Mean Daily Max.	57	63	69	78	87	98	105	102	95	82	68	58	80	35
Mean Daily Min.	33	38	43	51	60	69	76	74	65	53	40	33	53	35
Mean Monthly	45	51	56	65	74	84	91	88	80	68	54	46	67	35
Extreme Monthly Max.	80	81	90	100	110	117	119	115	116	101	86	77	119	35
Extreme Monthly Min.	10	16	21	31	41	48	59	54	46	25	17	12	10	35
Precipitation (in.)														
Monthly Mean	0.4	0.4	0.4	0.3	0.2	0.1	0.4	0.4	0.3	0.2	0.4	0.3	3.8	35
Monthly Max.	1.6	1.9	1.8	3.4	0.9	0.4	1.6	2.4	1.4	1.3	2.4	1.6	3.4	35
Monthly Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35
24-Hour Max.	0.8	0.8	1.0	1.3	0.6	0.4	1.6	1.8	1.2	1.0	1.2	1.2	1.8	35
Snowfall (in.)														
Monthly Mean	1	1	1	1	0	0	0	0	0	1	1	1	1	32
Monthly Max.	8	2	1	1	0	0	0	0	0	1	1	1	8	32
24-Hour Max.	5	2	1	1	0	0	0	0	0	1	1	1	5	32
Relative Humidity (%)														
Early Morning	54	52	49	36	32	22	29	30	31	35	40	45	38	10
Mid-Day	35	30	27	18	17	12	16	17	18	19	23	27	22	10
Surface Winds														
Prevailing Direction	NE	NE	S	S	S	SW	S	S	S	NE	NE	NE	S	10
Mean Speed (knots)	4	5	6	7	7	6	6	5	4	4	4	3	5	10
Max. Speed (knots)	54	53	55	53	58	59	61	63	52	47	44	49	63	24
Mean No. of Days of Occurrence														
Precipitation > 0.01 in.	3	3	3	2	1	1	2	2	2	2	2	2	25	35
Precipitation > 0.5 in.	1	1	1	1	1	0	1	1	1	1	1	1	1	35
Max. Temperature > 110°F	0	0	0	0	1	2	5	2	1	0	0	0	9	35
Max. Temperature > 100°F	0	0	0	1	2	14	26	22	9	1	0	0	73	35
Min. Temperature < 32°F	15	7	2	1	0	0	0	0	0	1	1	16	44	35
Min. Temperature < 25°F	4	1	1	0	0	0	0	0	0	0	1	3	8	35

Source: Base Weather Officer.

The Las Vegas Valley is a structural basin in which the consolidated rocks have been subjected to a complex history of faulting for many millions of years. As faulting caused the basin to subside, sediment eroded from the nearby mountains filled the subsiding basin. Thus, over a long period of time a series of coalescing alluvial fans formed by streams draining the surrounding mountains filled the basin. The slope of the fans is greatest near the mountains and decreases gradually toward the lowlands of the basin. No playas currently exist in the Las Vegas Valley, but the area in the eastern part of the basin between Nellis Air Force Base and Las Vegas Wash probably was a playa in the recent geologic past (Malmberg, 1965).

Both consolidated and unconsolidated rocks occur in the Las Vegas Valley. A generalized description of the principal lithologic units is shown in Table III-2.

The consolidated rocks that occur in the mountains surrounding the basin and beneath the valley fill include a wide variety of sedimentary, metamorphic, and igneous rocks ranging in age from Precambrian to Quaternary. In general, these rocks are dense, well-indurated, and of low permeability. In other parts of southern Nevada, some carbonate rocks are an important regional aquifer. Though some carbonate rocks crop out in the nearby mountains, it is not known if they are present at depth in the Las Vegas Valley. Deep test holes indicate that the depth to consolidated rock in the Las Vegas Valley may be several thousand feet. There is no evidence that the consolidated rocks beneath the Las Vegas Valley are in significant hydrologic connection with the more widely used aquifers in the valley fill.

The unconsolidated sediments that fill the basin comprise the principal water-bearing units for the Las Vegas Valley

Table III-2
PRINCIPAL LITHOLOGIC UNITS

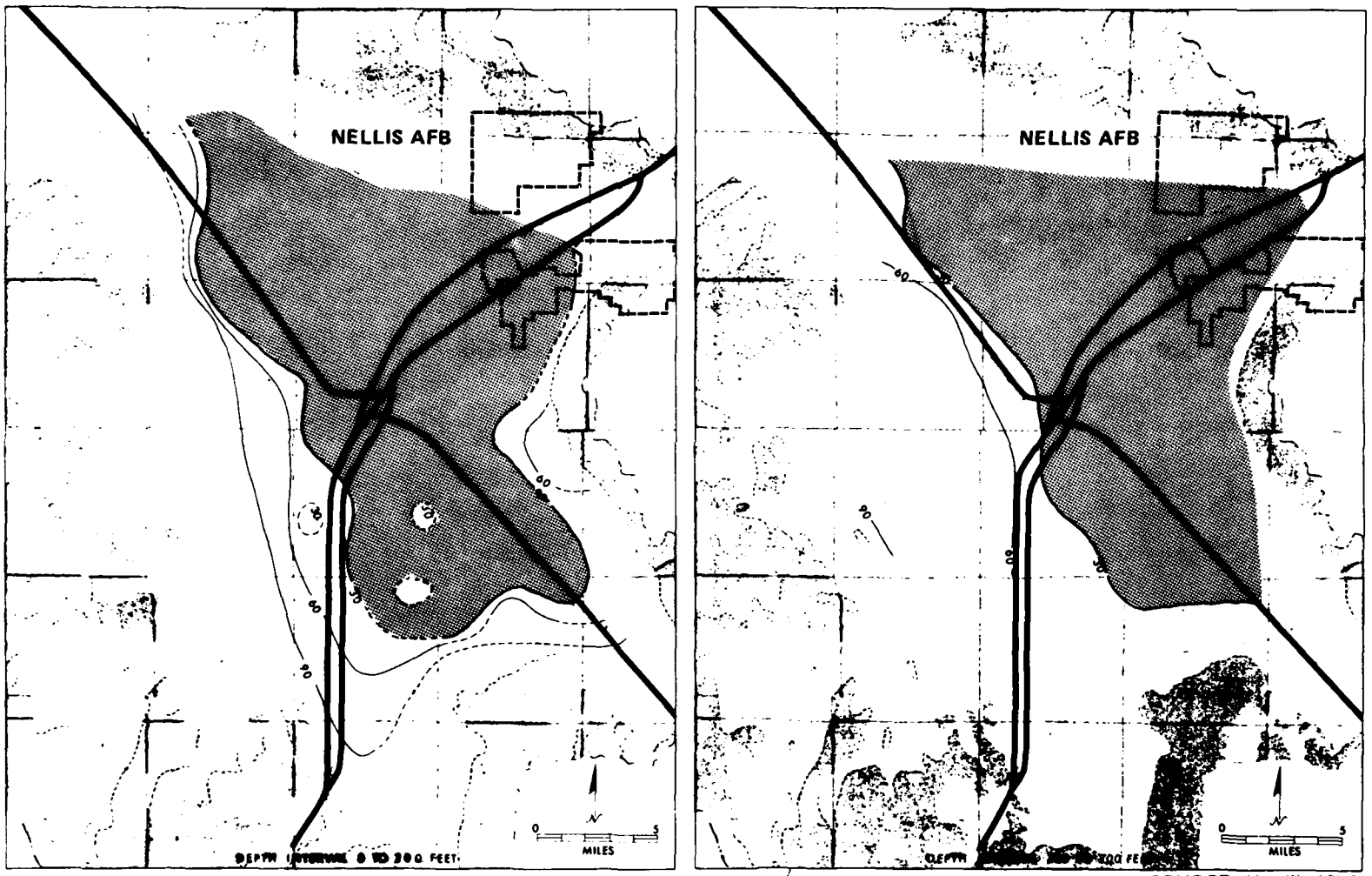
Age			Unit	Thickness (feet)	Lithology	Occurrence	General hydrologic properties
QUATERNARY	Pleistocene and Holocene	Valley fill	Surficial deposits	50±	Unconsolidated gravel, sand, silt, and clay.	Occurs throughout area of valley fill. Exposures not continuous but are limited to areas of Holocene and Late Pleistocene deposition. On alluvial fans, unit consist of stream-channel and slope-wash deposits. In lower parts of valley, unit occurs as fairly extensive deposits of sand, silt, and gravel. Included with alluvium in figure 2.	Generally above the zone of saturation on alluvial fan. In the southeast part of valley, saturated deposits may form a thin water-table aquifer. Westphal and Nork (1972, p. 1) estimated the average horizontal hydraulic conductivity of these deposits in the Henderson-East Las Vegas area to be about 400 gpd/ft^2.
	Pleistocene		Lake and playa deposits (includes Las Vegas Formation in fig. 2)	300±	Predominately clay, silt, and fine sand. Contains some regular, thin-bedded layers of sand and gravel.	Exposed at base of alluvial fans along west side of valley; as prominent lake-bed deposits at northwest end of study area; and as irregularly exposed deposits in central part of valley. Well logs indicate upper valley-fill deposits in central part of valley commonly consist of a sequence of silt, clay, and caliche. Figure 2 shows extent of Las Vegas Formation as mapped by Longwell and others (1965) and Price (1966).	When saturated, fine-grained deposits may store appreciable quantities of water but have low permeability and transmit water poorly. Unit acts as a confining layer. When water is removed from storage, compaction and land subsidence may result. Unit yields some water to domestic wells.
			Fanglomerate and valley-floor deposits	1,000±	On alluvial fan, predominately gravel and and sand with some silt and clay. Deposits may be well cemented with caliche. On valley floor, generally silt and clay with interbedded sand and gravel. Lithology similar to overlying lake-bed and playa deposits. Upper contact arbitrarily located at top of first significant water-producing sand or gravel.	Occurs throughout area of valley fill. Exposed as alluvial fans but generally concealed by surficial deposits or lake and playa deposits on valley floor.	Gravel deposits along lower parts of fans transmit water readily and form most productive aquifers in valley. Finer gravel deposits in central part of valley produce water less readily but provide adequate supplies for domestic wells and moderate-capacity industrial and public supply wells. Heavy pumping in area of fine-grained deposits may result in land subsidence.
TERTIARY			Muddy Creek Formation	4,000±	Silt, clay, and sandstone, with some lenses of pebble conglomerate. Locally contains salt and gypsum beds. Interstratified basalt flows in some areas.	Forms prominent bluffs in southeast part of valley. Also exposed north and south of Frenchman Mtn. Probably underlies Quaternary valley-fill deposits throughout much of valley.	Low-permeability deposits which do not readily yield water to wells. Gypsum and salt may affect ground-water quality.
			Volcanic rocks	--	Complex assemblage of andesitic lava flows, volcanic breccia, and associated rocks. Includes some intrusive porphyritic rocks. Not differentiated.	Southwest of Las Vegas Valley floor, in McCullough Range and River Mtns. Includes small area of intrusive rocks in the McCullough Range.	Impermeable except where highly fractured; probably forms barrier to ground-water movement.
TRIASSIC TO CRETACEOUS		Consolidated rocks	Noncarbonate sedimentary rocks	3,500-8,000	Sandstone, shale, and conglomerate. Some interbedded limestone and gypsum.	Exposed on Frenchman Mtn. and along southwest border of area. Includes Thumb Formation, Aztec Sandstone, Chinle Formation, and Moenkopi Formation.	Generally impermeable; may transmit moderate amounts of water where fractured. Gypsum may affect sulfate content of ground water.
PRECAMBRIAN TO PERMIAN			Gypsiferous sedimentary rocks	2,000±	Limestone, dolomite, shale, conglomerate, and sandstone. Sequence contains significant amounts of gypsum.	Exposed on Frenchman Mtn. and along southwest border of area. Includes Kaibab Limestone, Toroweap Formation, and red beds.	Generally impermeable; may transmit moderate amounts of water where fractured, or where fractures have been enlarged by solution. Gypsum may affect sulfate content of ground water.
			Non-gypsiferous sedimentary rocks	20,000±	Limestone, dolomite, shale, sandstone, and quartzite.	Exposed on Frenchman Mtn., the Sheep Range, and Spring Mtns. Includes Bird Spring Formation, Monte Cristo and Sultan Limestones, Lone Mountain and Ely Springs Dolomites, Eureka Quartzite, Pogonip Limestone, Chisholm Shale, Lyndon Limestone, Pioche Shale, and Tapeats Sandstone.	Generally impermeable except where solution has caused a secondary enlargement of joints and fractures. May transmit large quantities of ground water in these areas.

SOURCE: Harrill, 1976.

including Nellis Air Force Base. There are two principal geologic units within the Las Vegas Valley fill: the Muddy Creek Formation, which consists of fine sand, silt, and clay; and alluvium, including the Las Vegas Formation, which consists of gravel, sand, silt, and clay that were deposited in alluvial fans and playas in the basin. The Muddy Creek Formation and the younger alluvium are distinct geologic units, but together they comprise the principal groundwater reservoir in the Las Vegas Valley. Refer to Table III-2 for additional descriptions of these units.

The water-bearing properties of the valley fill are not constant throughout the basin. In general, the ability of the valley fill materials to yield water to wells is dependent on the amount of high-permeability sand and gravel strata that are intersected by the wells. The map of sand and gravel percentage (Figure 4) shows that the area near Nellis Air Force Base is underlain by sediments relatively poor in sand and gravel. Better aquifers are found in the western portion of the basin. For example, the transmissivity was measured to be 1,000 to 2,000 gpd/ft at the on-base wells. These low transmissivity values indicate that the unconsolidated sediments in the Nellis area have a low average permeability, probably on the order of 1 gpd/ft^2. However, the existence of a low <u>average</u> permeability does not preclude the existence of thin lenses or stringers of much more permeable sand and gravel.

The Craig Road Wells (water systems annex), which are located 5 miles west of the base, tap better aquifers than occur at the base itself. The transmissivity measured at these wells is 30,000 to 40,000 gpd/ft. In this area, the average permeability of the unconsolidated sediments is moderate, on the order of 100 gpd/ft^2.



SOURCE: Harrill, 1976

EXPLANATION

Valley-fill

Consolidated rocks

Contact

Basin boundary

30 — Generalized line of equal percent sand and gravel. Interval 30 percent.

Shading indicates area less than 30 percent

Note: Data for depth interval 200-700 feet from *Domenico and others, 1964, fig. 8*

FIGURE 4
DISTRIBUTION OF SAND AND GRAVEL IN TWO DEPTH INTERVALS OF VALLEY FILL

The valley fill is cut by several faults (Figure 5). These faults were originally formed as a result of the tectonic forces operating in the area, but some may have been reactivated as a result of subsidence. Some of the faults are now manifested at the surface by fissures or escarpements. None of the fault scarps occurs near Nellis Air Force Base proper, but at least one fissure occurs near the Craig Road well field operated by the base (Water Systems Annex). The faults apparently act as partial barriers to groundwater flow and controlled the location of springs that formerly existed in the valley. Faults in unconsolidated sediments typically act as barriers to groundwater movement because they offset permeable strata and, in addition, the crushing and grinding of the unconsolidated materials during fault movement creates fault gouge, a clay-rich material that is of low permeability.

C. HYDROLOGY

1. Surface Water

No perennial streams exist in the vicinity of Nellis Air Force Base. Natural surface runoff is confined to infrequent precipitation events and does not represent a significant source of groundwater recharge.

In the summer, localized thunderstorms can produce high-intensity, short-duration rainfall events that can result in flooding. Regional storms, which generally occur in the winter months, are typically of low intensity so that flooding potential is low.

The surface drainage from the base is shown in Figure 6. Runoff from the base enters the Las

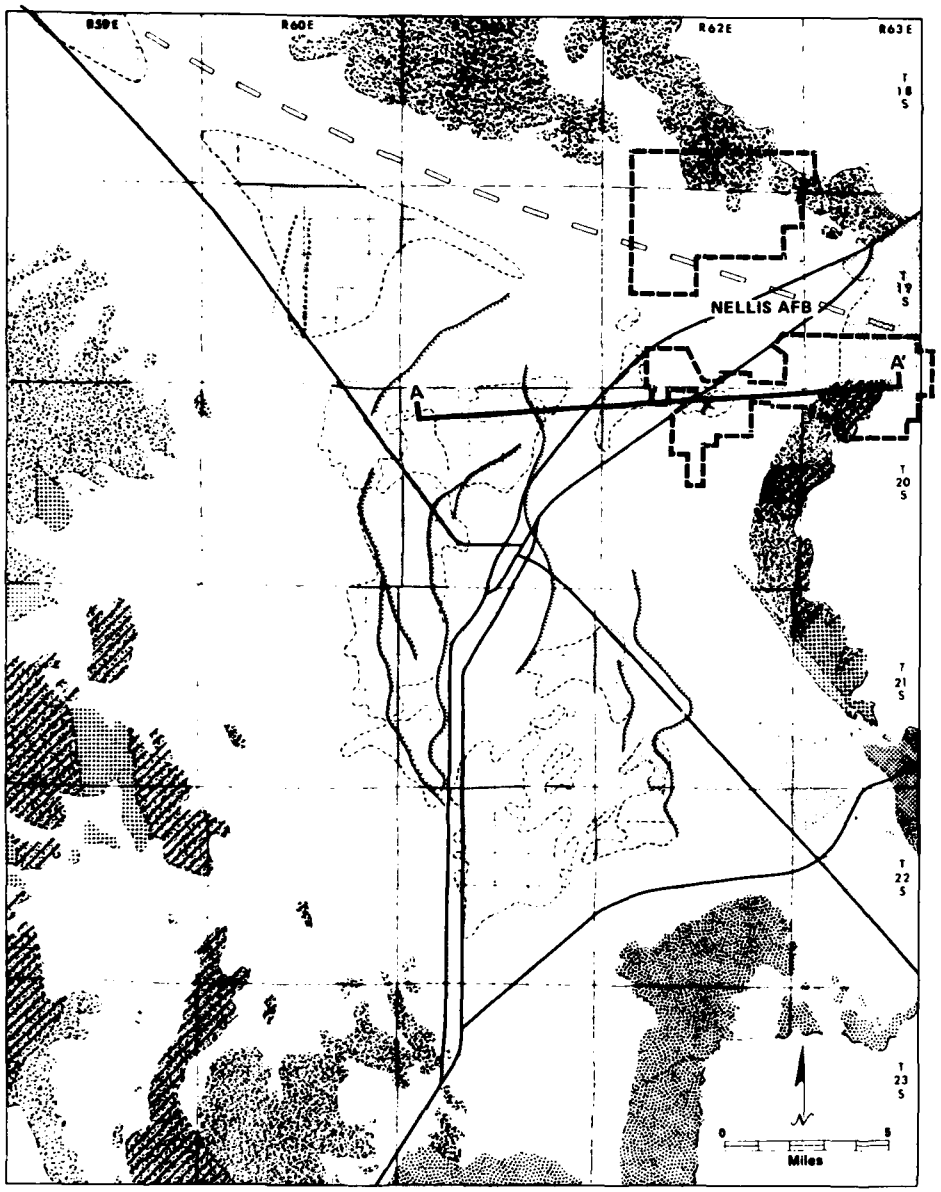
Vegas Range Wash system. Some eventually percolates to the shallow groundwater table and the remainder leaves the basin through Las Vegas Wash. A portion of Nellis Air Force Base is within the 100-year flood plain as mapped by the Soil Conservation Service (Figure 7). This degree of flooding is infrequent, of relatively short duration, and of shallow depth; the potential for increased contaminant migration is not significantly increased.

2. Groundwater Hydrology

Groundwater occurs beneath the Nellis Air Force Base area within the valley sediments. The extensive fine-grained deposits that occur in the eastern portion of the Las Vegas Basin serve to confine groundwater, although some shallow water most likely occurs beneath the base under unconfined conditions.

A significant portion of the base's water supply is obtained from on-base wells. The locations of these wells are shown on Figures 11 and 12 in Chapter IV. In addition to the on-base wells, there are two active wells located about 4 miles west of the base on Craig Road. The Craig Road wells are located in an area where the aquifers are more permeable so that their yield is higher. Representative logs of the Air Force wells were obtained from the Nevada State Engineer's Office and are presented in Appendix L.

Recharge to the groundwater in the Las Vegas area was originally restricted to infiltration of runoff in streams draining the Spring and Sheep Mountains



SOURCE: Harrill, 1976.

EXPLANATION

- Alluvium and lake beds undifferentiated — QUATERNARY
- Las Vegas Formation — QUATERNARY
- Muddy Creek Formation — TERTIARY
- Volcanic rocks — TERTIARY
- Non-carbonate sedimentary rocks — TRIASSIC THROUGH CRETACEOUS
- Carbonate sedimentary rocks. Hachure indicates presence of significant gypsum — CAMBRIAN THROUGH PERMIAN

Contact

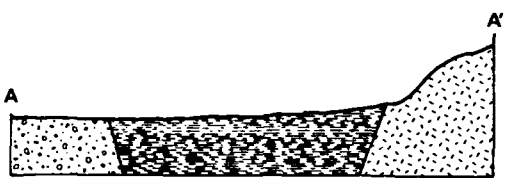
Scarp, (Maxey and Jameson, 1948

Fault

Lineament (spring mounds)

Basin boundary

Geology after: Longwell and others (1965) and Price (1966). Area shown for Las Vegas Formation is aggregate area as mapped in both reports. Future studies may reveal more extensive deposits



SCHEMATIC GEOLOGIC SECTION THROUGH NELLIS AFB

- Clay, Silt and Caliche
- Sand
- Gravel
- Consolidated Bedrock

FIGURE 5
GENERALIZED GEOLOGY

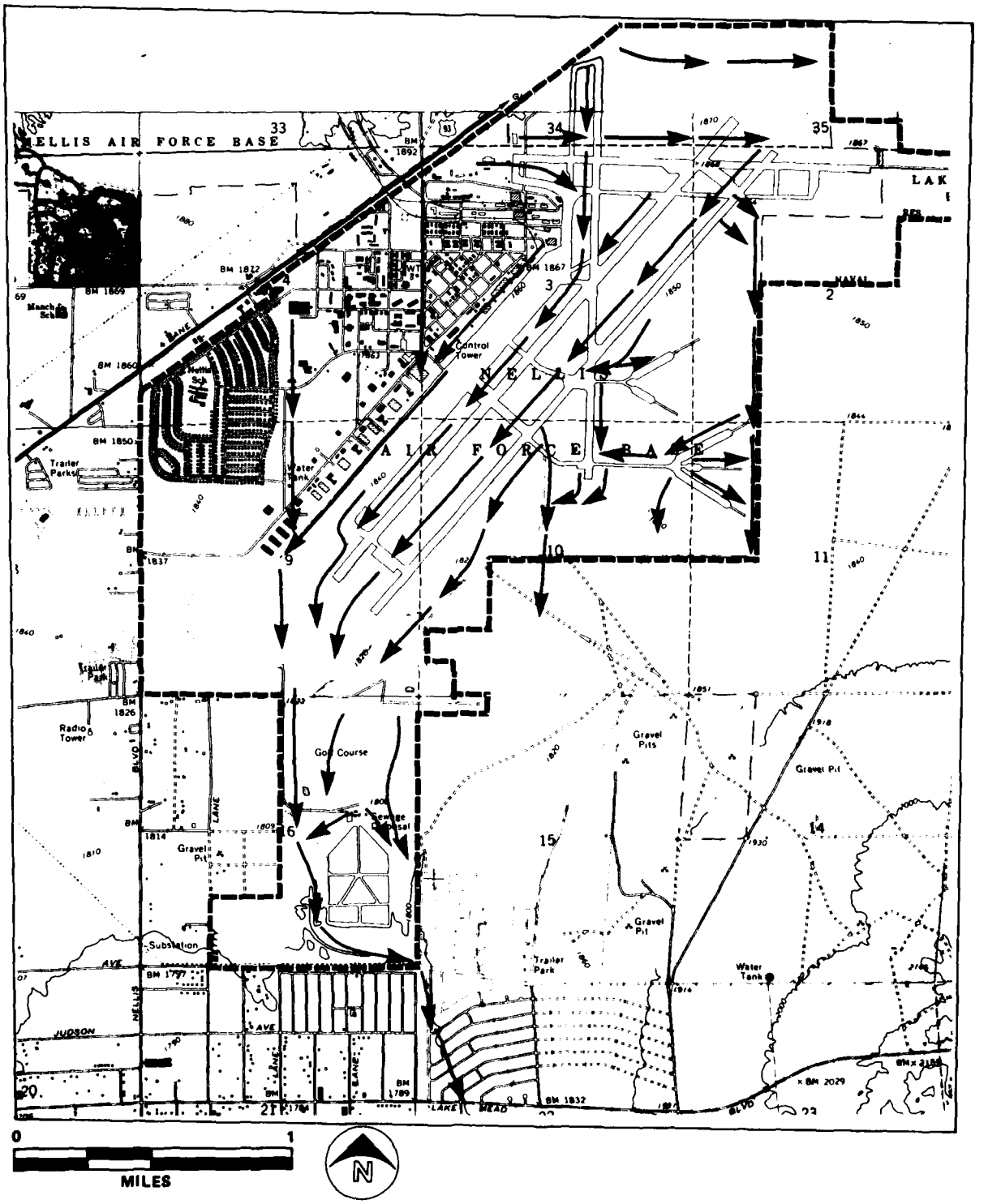
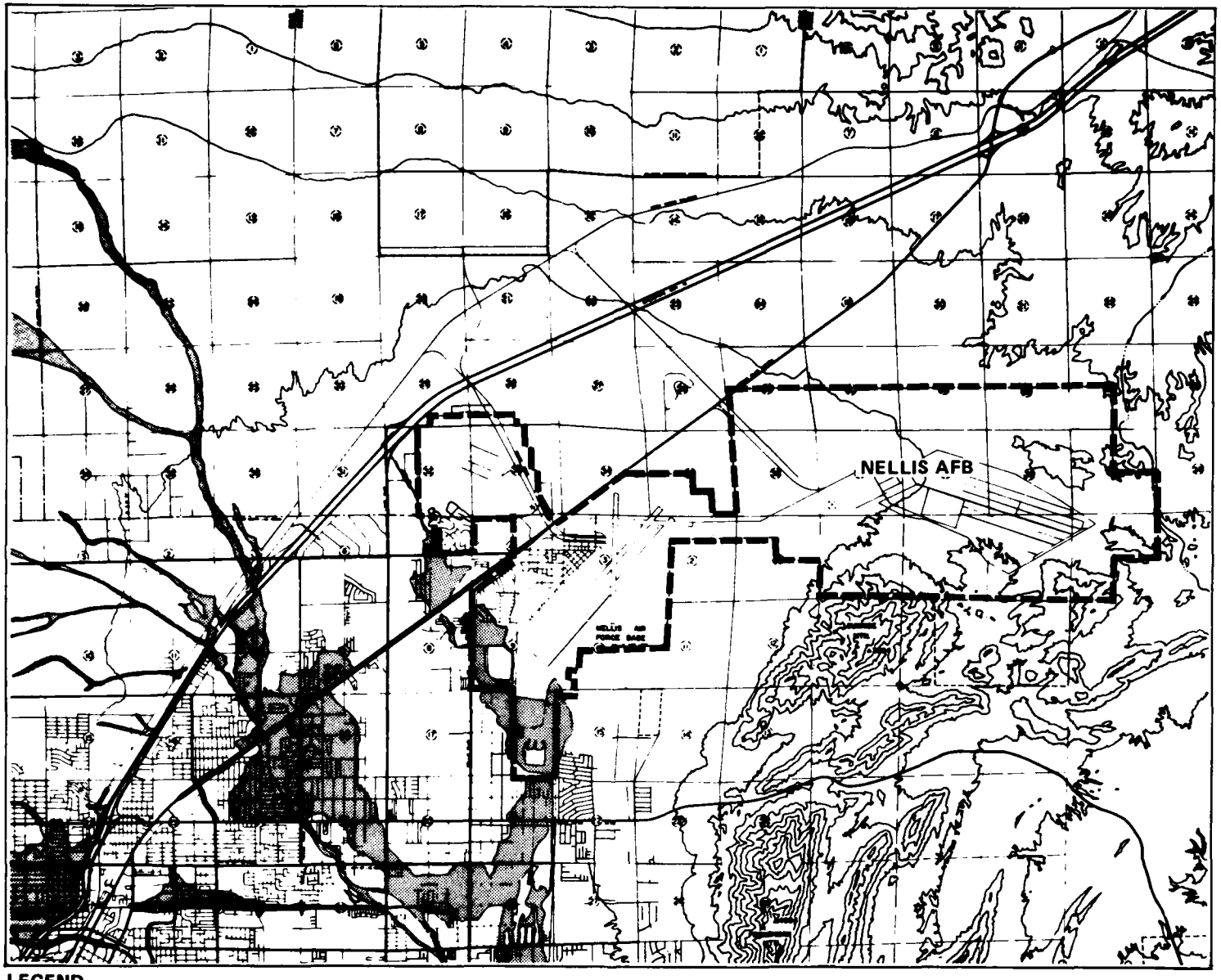


FIGURE 6
SURFACE DRAINAGE PATTERN
NELLIS AFB



LEGEND

100 Year Flood Plain

0 1 2 MILES

SOURCE: US Department of Agriculture, 1979

FIGURE 7
100 YEAR FLOOD PLAIN
LAS VEGAS BASIN

to the north and east. The low precipitation in the area precludes significant recharge from direct infiltration. Since urbanization of large portions of the basin has occurred, there has been a significant change in the amount and source of recharge to groundwater. Specifically, recharge by over-irrigation on landscape plants and by discharge of STP effluent has almost doubled the amount of valley-wide recharge above the natural rate.

Before reaching the water table, recharging water moves vertically downward in the unsaturated zone. During unsaturated flow, the permeability is a variable function of the water content; the more moist the unsaturated medium is, the higher is its permeability. This means that the rate of movement in the unsaturated zone is predominantly controlled by the amount of water entering at the surface. Under natural conditions, precipitation was the only source of water, other than streamflow, that could have entered the ground. However, the precipitation rate in the Las Vegas area is so low that virtually all infiltrated precipitation is consumed by evapotranspiration. Therefore, the rate of movement of a contaminant from the surface to the water table would be very slow, unless it were mobilized by another source of water. The rate of downward movement would be controlled by the amount of infiltrated water. For example, very "wet" sources of contamination, such as sewage effluent, could reach the water table very quickly. Dry contaminants disposed of in areas remote from water sources could move downward only at very slow rates, possibly requiring hundreds of years to reach the water table.

Under natural conditions, discharge from the groundwater basin occurred principally by spring discharge and consumption by extensive areas of phreatophytes. Following urbanization and pumping from deep wells, spring discharge and phreatophyte consumption have decreased greatly. Currently, the major path of groundwater discharge from the basin is to Las Vegas Wash, which eventually reaches Lake Mead.

Originally groundwater levels were at or near the surface throughout a large area of Las Vegas Valley. Extensive areas of meadows and phreatophytic vegetation formerly existed in areas now occupied by downtown Las Vegas and the Strip. In the vicinity of Nellis Air Force Base, the groundwater table under prepumping conditions was deep enough to prevent the growth of phreatophytes. The potentiometric surface of Nellis was zero to 50 feet below the surface under predevelopment conditions.

As Las Vegas developed, an increasing amount of groundwater was pumped from the Las Vegas aquifers. The rate of pumping increased until the early 1970's, when 80,000 acre-feet per year were pumped. This pumpage represented extraction at over twice the estimated rate of recharge. This overdraft on the groundwater basin caused a long-term progressive decline in groundwater levels. This is exemplified by the hydrographs of two of the Nellis Air Force Base wells shown on Figure 8. The long-term decline in water levels ceased in the 1970's when imported water from Lake Mead became available to replace groundwater. As more water from Lake Mead is imported into the Las Vegas area, groundwater pumpage will decline.

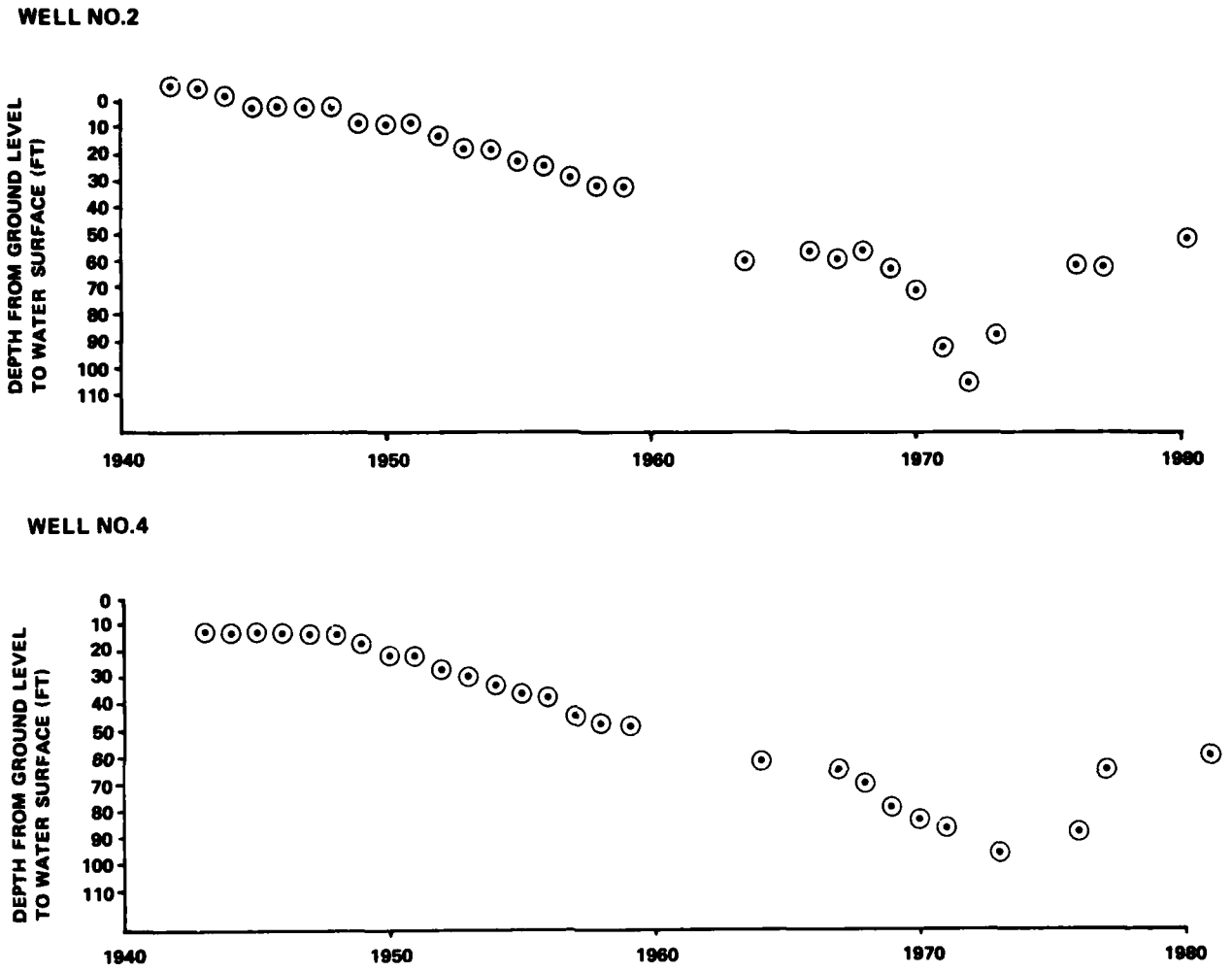


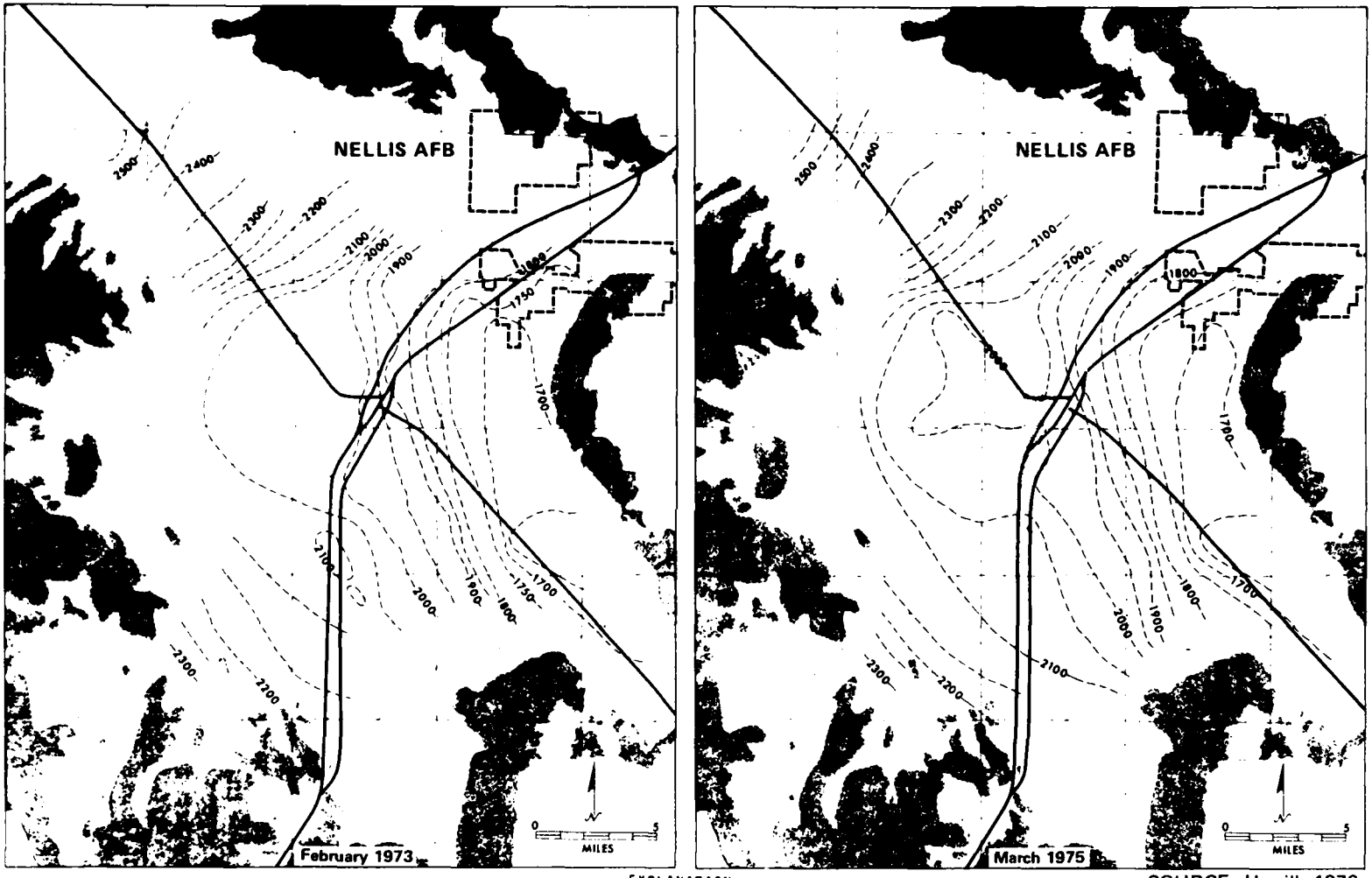
FIGURE 8
HYDROGRAPHS OF WELLS OPERATED BY NELLIS AFB

The map of the potentiometric surface (Figure 9) of the confined aquifers shows that deep groundwater moves in a generally southeasterly direction. There are insufficient data to determine the direction of shallow groundwater movement in the vicinity of Nellis Air Force Base. It is likely that the shallow groundwater moves in a similar direction as that in the deep, principal aquifers of the basin.

In some areas of the Las Vegas Basin, separation between the shallow groundwater and the deeper confined aquifer is relatively continuous. Some degree of interconnection occurs in all areas, however, and even though the primary contamination risk is in the shallow groundwater, contamination of the deep aquifer could occur. Contamination of the on-base water wells is less likely because of extreme depth of the wells and the thick layers of clay and silt separating the shallow and deep aquifers beneath the base.

The average interstitial velocity of the shallow groundwater is not known in the vicinity of the Base. Typically, groundwater in valley fill aquifers such as that occurring in the Nellis AFB area moves in the range of 10 to 200 ft/yr.

The depth to unconfined groundwater beneath Nellis Air Force Base ranges from 50 to 100 feet. Groundwater levels in Area III and in the small arms range become progressively deeper toward the mountains.



EXPLANATION

SOURCE: Harrill, 1976.

Valley-fill

Consolidated rocks

Contact

Basin boundary

----------2000----------
Water-level contour, shows altitude of water levels in wells that penetrate the principal aquifers. Dashed because approximately located. Contour interval 50 feet. Datum is mean sea level

lls that

FIGURE 9
WATER LEVEL CONTOUR MAPS FOR WELLS THAT PENETRATE THE PRINCIPAL AQUIFERS, FEBRUARY 1973 AND MARCH 1975

As indicated above, the Las Vegas area has experienced subsidence of the land surface. Part of this subsidence has been a result of regional warping caused by the filling of Lake Mead. Another portion of the total subsidence has been caused by declining artesian pressure, which in turn causes clay beds to compact. The Nellis Air Force Base has experienced about 1/2 foot of total subsidence. However, in the area of the Craig Road wells, subsidence has been more than 1-1/2 feet.

One surface manifestation of subsidence has been the creation of fissures that tend to follow preexisting faults in the unconsolidated sediments. No fissures occur on Nellis Air Force Base proper, but one exists in the Craig Road well field. The fissures are potentially significant in that they could provide a conduit for rapid movement of contaminants to the water table. However, there are no fissures anywhere near the known disposal sites at Nellis Air Force Base.

In general, groundwater quality is good in the vicinity of Nellis Air Force Base. No conclusive evidence of offbase movement of pollutants has been found. There are two known areas where groundwater quality does not meet drinking water standards. These are described below.

Area II (Lake Mead Base). Groundwater in this area can exceed standards for arsenic and fluoride (refer to Appendix M). In addition, wells that tap gypsum-rich aquifers near Sunrise Mountain are typically high in total dissolved solids and sulfate. The poor water quality found in Area II is

due to natural causes. No man-caused pollution of groundwater has been found in this area.

Area South of the Golf Course. Samples from a monitoring well operated by the USGS and located along Anne Lane in the trailer park south of the Nellis AFB boundary exceed drinking water standards in sulfate, TDS, and nitrate (see Appendix M and Figure 10). The high sulfate and TDS are typical of groundwater in gypsum-rich sediments. The cause of the high nitrate is not known. A possibility exists that the elevated nitrate levels could have been caused by wastewater disposal practices either off base or on base.

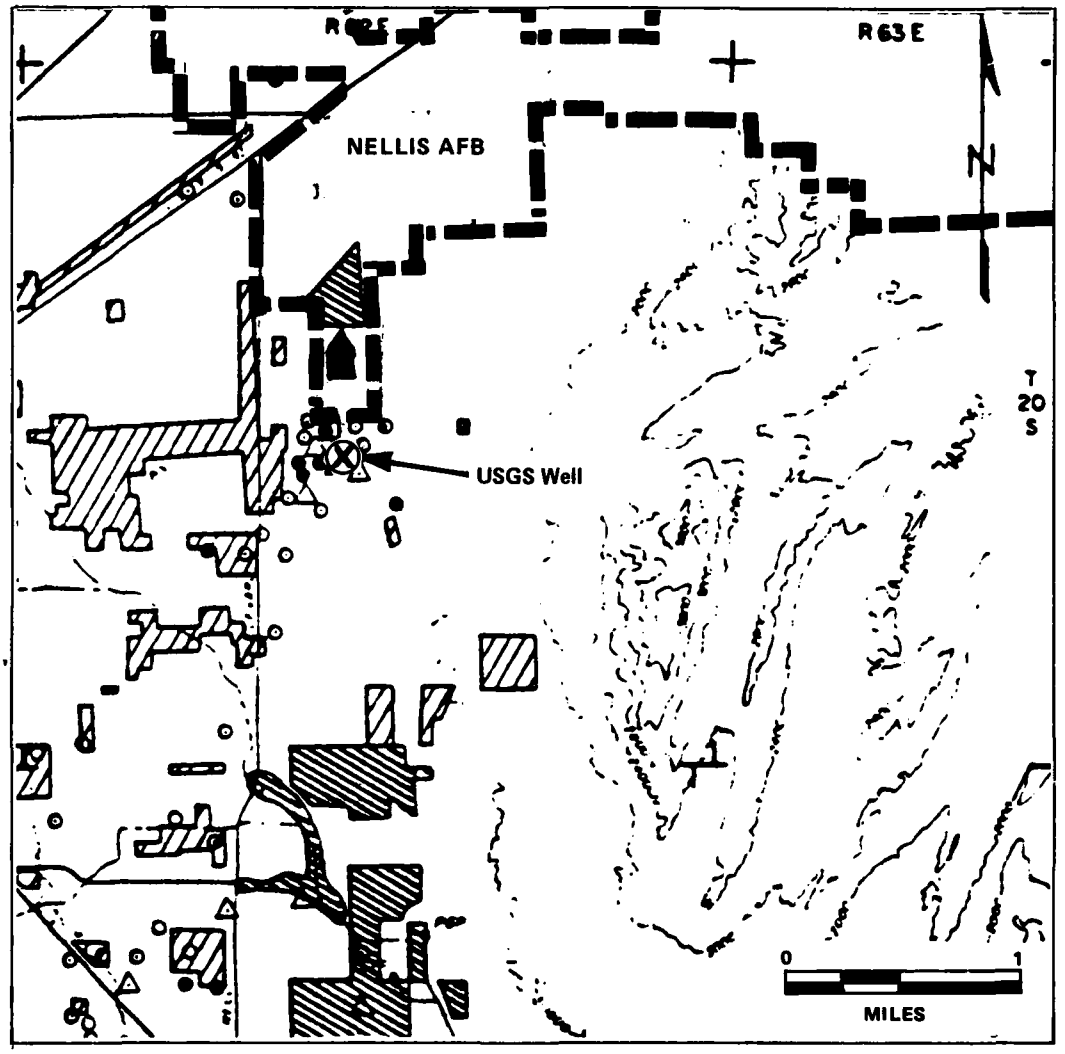
D. ENVIRONMENTALLY SENSITIVE CONDITIONS

1. Habitat

The Las Vegas Valley contains a diverse array of vegetation types. This area lies between the Mojave Desert to the west and south and the Great Basin Desert to the north. A transitional zone, which includes the Las Vegas area, extends west from southwestern Utah to southern California.

The most widespread biotic community in the vicinity of Nellis Air Force Base is the creosote-bush community comprised primarily of creosote bush and bur-sage. In undisturbed areas around Nellis AFB, these shrubs grow in scattered clumps that increase in density near water sources.

The vegetation surrounding the unused STP percolation pond area and along the storm drainage ditch



SOURCE:
Kaufmann, 1976

CONCENTRATION, (NO_3^{as})

- 10 to 20mg/l
- 21 to 45 mg/l
- 46 to 100 mg/l
- 101 mg/l or more

SOURCES (Past & Present)

- Areas of on-site sewage disposal
- Areas irrigated with sewage

FIGURE 10
GENERALIZED MAP SHOWING THE SOURCES AND CONCENTRATIONS OF NITRATE IN GROUNDWATER

consists of tree/shrubs including mesquite and tamarax. The existing STP percolation ponds in Area II support a healthy riparian community including sedges, rushes, and tamarax.

The density of plant communities within the boundaries of Nellis AFB, Area II, and Area III is reduced compared to naturally occurring undisturbed communities adjacent to base boundaries. This is to be expected due to normal development.

2. Rare and Endangered Species

No sensitive habitat is known to exist in the vicinity of Nellis AFB, Area II, or Area III. Table III-3 lists Federal- and State of Nevada-designated endangered and threatened plant and wildlife species that may occur within the Nellis Air Force Base boundaries. (Refer to Appendix N for defnitions of the state and Federal designations). Field observation by a CH2M HILL team member resulted in an unconfirmed identification of the Califcrnia desert poppy (Arctomecon californica; Endangered - Nevada, Candidate - USFWS) in the landfill northeast of Area III (Site No. 2). The base environmental program has been advised of this siting.

3. Summary of Environmental Stress Potential

Precipitation is extremely low at Nellis AFB and the potential evaporation is high. Although portions of the base lie in a 100-year flood plain and localized flooding occurs during high-intensity rainfall events, overall, the natural driving forces

Table III-3
ENDANGERED AND THREATENED BIOTA OF CLARK COUNTY
POTENTIALLY IN THE VICINITY OF NELLIS AFB

Vegetation	Common Name	Status
Arctomecon californica	California desert poppy	E-NV, C-USFWS
Astragalus geyeri var. *triquetrus*		E-NV, C-USFWS
Astragalus nevinii		E-NV, C-USFWS
Cryptantha insolita	Cats eye	E-NV, C-USFWS
Eriogonum viscidulum	Wild buckwheat	E-NV, C-USFWS
Penstemon thurberi var. *anestlus*		E-NV
Wildlife		
Heloderma suspectum	Gila monster	P, R-NV
Gopherus agassizi	Desert tortoise	P, R-NV
Euderma maculata	Spotted bat	P, R-NV
Pelecanus occidentalis	California brown pelican	E-USFWS
Falco peregrinus	American peregrine falcon	E-NV, E-USFWS
Haliaeetus leucocephalus	Bald eagle	E-NV, E-USFWS

E = Endangered.
C = Candidate under review.
P = Protected.
R = Rare

and pathways for hazardous contaminant migration are inconsequential.

Other than the plant and wildlife species identified in paragraph 2, no sensitive receptors were identified and no signs of significant environmental stress were observed.

IV. FINDINGS

A. ACTIVITY REVIEW

1. General

Major activities at Nellis AFB that have resulted in the generation of potentially hazardous wastes include vehicle maintenance, aircraft maintenance, ground support equipment maintenance, and aircraft corrosion control. Other waste-generating activities have included pest control, laboratory operations such as photo development and nondestructive inspection, fuels analysis, nuclear weapon assembly, and a small plating operation.

2. Industrial Operation

A listing of major industrial operations and chemical usage requirements is presented in Table IV-1. All solid wastes were disposed of in the base landfills prior to the early 1970's. Drum reclamation was begun in the early 1970's, but all other solid wastes are still landfilled.

A summary of liquid waste generation rates for the major shops is presented in Table IV-2. Maintenance solvents and paint strippers used at the base include trichloroethane, trichloroethylene (TCE), methyl ethyl ketone (MEK), toluene, and PD-680 (safety solvent). Carbon tetrachloride use during the 1960's was reported.

Table IV-1
MAJOR INDUSTRIAL USERS OF POTENTIALLY HAZARDOUS CHEMICALS

Description	Present Location[1] (Bldg. No./ Initial Date)	Past Location (Bldg. No./ Initial Date)	Chemical Usage[2] Type	Quantity (gal/mo)
57 FIGHTER WEAPONS WING				
Armament Recording Process Lab	122/1942		Fixers, developers, bleach	1,100
USAF AIR DEMONSTRATION SQUADRON				
Thunderbird Maintenance	148/1942[3]		MEK, paint, thinner	25
USAF HOSPITAL				
Dental Lab	625/1965			
Clinical Lab	625/1965			
Dental Clinic	625/1965			
Medical Maintenance	625/1965			
Radiology	625/1965		Developers, fixers	40
57 AIRCRAFT GENERATION SQUADRON				
414 AMU/F-4E	157/1977			
66 AMU/A-10	157/1977			
433 AMU/F-15	157/1977			
64/65 AMU/F-5	151/1963			
57 COMPONENT REPAIR SQUADRON				
Electric Shop	173/1957		Battery acid, sodium bicarbonate	50
Precision Measurement Equipment Lab	425/1969	589/1956		
Machine Shop	173/1957			
Metals/Welding	173/1957		Oil, sodium chloride, sodium silica, fluoride	--
Nondestructive Inspection	168/1971	173/1957	MEK, trichloroethane, penetrant, developer	40
Pneudraulics	173/1957			
Structural Repair	173/1957	912/--	Solvents, degreasers, adhesives	<1
Engine Cleaning	857/1968		PC-111, alkaline descaler, caustic, phosphoric acid	>200
Engine Shop	858/1961	148/1956, 159/1954	PD-680, toluene, MEK, trichloroethane, carbon remover	1,300
Engine Test Cell	799/1956			
Photo Shop	173/1957			
57 EQUIPMENT MAINTENANCE SQUADRON				
AGE Maintenance	415/1965	157/1963, 912/--	PD-680, soaps, cleaning compound	360
Nonpowered AGE	415/1961		PD-680, soaps	75
Corrosion Control	191/1961	912/--		
Fuel Systems Repair	192/1969		MEK, alcohol, JP-4	20
Wheel and Tire	173/1981	189/1969	PD-680, methylene chloride, MEK, toluene	200
Explosive Ordnance Disposal	10234/1957			
Missile Maintenance	10416/1954		TCE, trichloroethane, alcohol	7
Repair and Reclamation	175/1954			
Equipment Maintenance	10108/1960		Paint, adhesives, solvents	<5
Armament Systems	178/1971		PD-680, oil, MEK, dichloromethane	20
554 SUPPLY SQUADRON				
Fuels Laboratory	814/1972		Potassium dichromate, sulfuric acid, alcohol, ether	<5
554 TRANSPORTATION SQUADRON				
Battery Shop	829/1954		Battery acid, sodium bicarbonate	60
Fire Truck Maintenance	170/1963		PD-680	<1
Refueling Maintenance	854/1969		Lube oil, soaps, transmission fluid, antifreeze	300
Vehicle Maintenance	831/1954		Carbon remover, paint, and thinner	190
Tire Shop	849/1942			

Table IV-1
(continued)

Description	Present Location[1] (Bldg. No./ Initial Date)	Past Location (Bldg. No./ Initial Date)	Chemical Usage[2] Type	Chemical Usage[2] Quantity (gal/mo)
554 COMBAT SUPPORT GROUP				
Auto Hobby Shop	840/1974	554/1943		
Base Photo Lab	118/1966		Bleach, developer, fixer, acetic acid	250
554 CIVIL ENGINEERING SQUADRON				
Entomology	817/1960	563/1955	Pesticides and soil sterilants	Liquid 15; solid, 200 lb/mo
Exterior Electric	817/1943			
Golf Course Maintenance	1600/1952		Pesticides, caustic	--
Heating Maintenance	817/1943			
Hospital Boiler Maintenance	625/1965		Caustic soda, tannic acid, phosphate	75 lb/mo
Liquid Fuels Maintenance	887/1943		PD-680, paint	<1
Power Production	816/1943		Battery acid, PD-680, antifreeze, carbon remover	50
Protective Coating	853/1943			
Sheet Metal/Welding	817/--	173/1957	Acetone, trichloroethane	<1
474 AIRCRAFT GENERATION SQUADRON				
428 AMU	174/1956			
429 AMU	176/1971			
430 AMU	179/1971			
474 EQUIPMENT MAINTENANCE SQUADRON				
AGE Repair and Inspection	199/1968		Soaps, PD-680, fuel	250
Nonpowered AGE	198/1963		Lacquer, paint, degreaser	<1
Fuel Systems Repair	202/1972		MEK, alcohol, hydrazine, JP-4, ammonium hydroxide	12
Armament Systems	196/1963		PD-680, TCE	5
474 COMPONENT REPAIR SQUADRON				
Aircraft Electric	415/1961			
Photo	415/1961		MEK, alcohol, trichloroethane, acetone	2
Pneudraulics	173/1957		PD-680, adhesives	--
820 CIVIL ENGINEERING SQUADRON				
Power Production	10120/1954			
Sheet Metal/Welding	10118/1954			
Vehicle Maintenance	10116/1954		Battery acid, cleaning fluid	6
Paint	10118/1954		Paints, lacquers, thinners	150
3096 AVIATION DEPOT SQUADRON				
Plant A	10402/1954		Alcohol, MEK, toluene, trichloroethane, cyclohexanone, acetone	<5
Plant B	10412/1954		Alcohol, MEK, toluene, trichloroethane, acetone, PD-680	<5
Equipment Maintenance	10304/1954		PD-680, acetone, toluene	17
4440 TACTICAL FIGHTER TRAINING GROUP				
Red Flag Photo Processing	201/1971		Developers, fixers, bleach	150
DET 1, 57 FIGHTER WEAPONS WING (INDIAN SPRINGS)				
Field Shops	265/1951			
Helicopter Maintenance	79/1957		PD-680, MEK	4
554 COMBAT SUPPORT SQUADRON (INDIAN SPRINGS)				
Medical Clinic	260/1954			
Vehicle Maintenance	225/1976		PD-680, sulfuric acid, soaps, paints	50
Electric	231/1943			
Heating	231/1943		Descaler, cyclohexamine, phosphate, caustic soda	Descaler, 12; other, 50 lb/mo

Table IV-1
(continued)

Description	Present Location[1] (Bldg. No./ Initial Date)	Past Location (Bldg. No./ Initial Date)	Chemical Usage[2]	
			Type	Quantity (gal/mo)
Protective Coating	231/1943		Paints, thinners, lacquers	20
Sheet Metal/Welding	234/1943			
Power Production	232/1943			
Auto Hobby Shop	140/1953			

Source: Bioenvironmental Engineering Shop Files.

[1]Date given is the year the shop was constructed unless information on past locations is provided. Squadron designations and activities have changed in some cases.

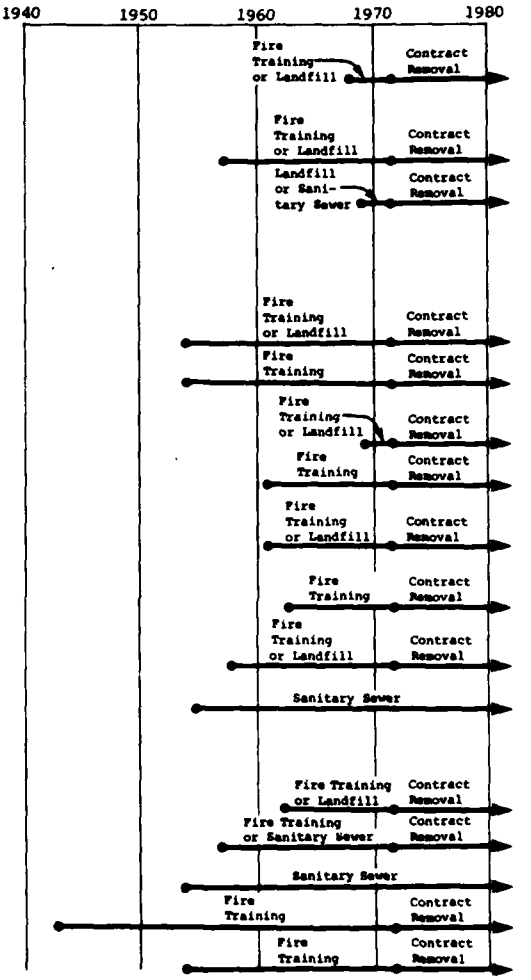
[2]Incorporates information from 1977 to present.

[3]Thunderbirds arrived in 1956. The hangar was previously used for maintenance activities.

Table IV-2
SHOP LIQUID WASTE GENERATION, NELLIS AFB

Facility No.	Facility Description	Type	Annual Quantity
857	Engine Cleaning	Acid, Caustic, POL	2,400 gal
168	Non-Destructive Inspection	MEK, trichloroethane, TCE penetrant	400 gal
173	Wheel and Tire	Degreaser	75 gal
858	Engine Repair	Acid, caustic PD-680, MEK, trichloroethane, toluene, TCE, carbon tetrachloride	19,100 lb 3,500 lb
831	Vehicle Maintenance	POL	12,000 gal
854	Refuel Vehicle Maintenance	POL Slop Paint	--- 660 gal
191	Corrosion Control	POL	2,000 lb
415	AGE	POL, PD-680, TCE	360 gal
170	Fire Truck Maintenance	POL	---
173	Pneudraulics	Hydraulic Fluid, TCE, PD-680	2,400 gal
817	Entomology	Pesticide residue	---
--	AMU Shops	MEK, trichloroethane, PD-680, TCE POL	1,500 gal 1,200 gal
173	Structural Repair	POL	55 gal
829	Battery Shop	Acids	1,200 gal
840	Auto Hobby Shop	POL	3,600 gal
10116	Vehicle Maintenance	POL	3,000 gal

Past and Present Disposal Practice



[a]Prior to the initiation of contract removal and off-base disposal in the early 1970's, the majority of POL was burned (120,000 gallons/year) and the remainder was landfilled or discharged to the sanitary sewer. Contract removal for fiscal year 1979 was 63,000 gallons.

Wastes generated by the maintenance operations include spent solvents, waste oils, hydraulic fluid, fuel, and grease. Wastes generated by corrosion control activities include slop paint, spent solvents, and spent strippers. A variety of waste chemicals are generated by the laboratory operations, and solid and liquid radioactive wastes have been generated by USAF TFWC Complex support activities and weapons maintenance.

Aircraft and ground support equipment maintenance activities are accomplished by various squadrons within the 57th Fighter Weapons Wing and the 474th Tactical Fighter Wing. Each wing uses the same shop facilities. The waste generation rates listed in Table IV-2 are for shops in the 57th Fighter Weapons Wing. Generally, the quantity of wastes generated by the 474th Tactical Fighter Wing shops would be much lower because fewer aircraft are maintained.

Specific information about several shop operations is presented as follows to provide additional perspective on significant industrial wastes generated at Nellis AFB:

- Aircraft Maintenance - Aircraft maintenance has occurred in virtually every hangar on base including 148, 151, 180, 153, 173, 175, and 191. Since 1972, the majority of waste POL has been removed by contract. Before then, the wastes went to fire training or to the sanitary sewer. During the early 1950's, as many as 100 piston engine aircraft

single- and multi-engine) were maintained in building 233. A phenolic-based carbon remover may have been used at this time. During the early 1950's, waste POL may have been drained into the original STP effluent ditch. Prior to the arrival of the F-111 aircraft during the early 1970's, solvent usage was reported to be much less than is currently used in the aircraft maintenance shops.

- Metal Plating - A small plating operation was located on base from the early 1950's until the mid-1970's. The shop was in building 912 until 1962 and then moved to building 173. Miscellaneous plating wastes were discharged to the sanitary sewer, but the type and quantity could not be identified.

- Precision Measurement Equipment Laboratory - Small quantities of carbon tetrachloride and TCE have been used in this lab. Low-level radioactive wastes are shipped off base by the Transportation Management Office for disposal.

- Pneudraulics - As much as 50 to 100 gallons per month of TCE were used in this shop prior to 1970. PD-680 is currently used. The wastes may have been discharged to the sanitary sewer.

- Engine Shop - During the 1950's and early 1960's, 250 gallons per year of carbon remover (possibly phenolic based) were discharged to the sanitary sewer. Carbon tetrachloride was used during the early 1960's.

- Engine Cleaning - As much as 100 gallons per month of TCE have been used in this area. TCE was discharged to the sanitary sewer from 1960 to 1968. Currently, the spent TCE is removed by contract. Approximately 40 gallons per month of carbon remover were also discharged to the sanitary sewer.

- Battery Shops - Neutralized lead-acid battery acids from ground support equipment and motor vehicles have always been discharged to the sanitary sewer. The total quantity may approach 150 gallons per month.

- Auto Hobby Shop - Waste POL from the auto hobby shop has always gone to storage tanks for disposal or reclamation. Antifreeze and detergents are discharged to the sanitary sewer.

- Corrosion Control - Corrosion control was originally located in building 912, but all hangars were reported as having a paint shop at one time. Wash water from the spray booths is skimmed and the underflow has always been discharged to the sanitary sewer. The skimmings have always been deposited in the base landfill. Toluene, MEK, and TCE have been used as solvents and strippers. Major aircraft stripping has not been done at Nellis AFB.

- Structural Repair - Small quantities of MEK and TCE have been used in this shop. Waste rags have gone to the base landfill.

- Vehicle Maintenance - Waste POL generation from vehicle maintenance has ranged from 200 gallons per month during the early 1950's to 1,000 gallons per month during the early 1970's. Prior to the early 1970's, the majority of waste POL was burned at fire training. Since then, most of the waste POL has been reclaimed. Both PD-680 and MEK are currently used in the shop.

- Vehicle Maintenance (Area II) - Most of the vehicle maintenance in Area II is performed by RED HORSE, a combat civil engineering group. RED HORSE has been in Area II since the late 1960's. Approximately 3,000 gallons per year of waste oil are discharged to recovery tanks for reclamation. Reportedly, Navy maintenance activities were low during their occupation of the area prior to 1969.

In summary, essentially all of the base shops have been and are connected to the sanitary sewer system. Effluent from the sewage treatment plant was discharged to percolation ponds and used to irrigate the base golf course. Complete degradation of potentially hazardous organic wastes was not likely. Prior to the increased emphasis on waste POL recovery in the early 1970's, much of the waste was burned at fire training or discharged to the sanitary sewer. During the early 1970's, container recovery was also started. A temporary drum storage area was established in Area III in 1981. Leaded paint, fog oil for insect control, tetrachloroethylene, and waste POL containers were observed as were several old batteries. Major drum storage

has been provided at DPDO near the motor pool. Before the early 1970's, all of the shop solid wastes were deposited in the base landfills.

Oil/water separators were installed on many of the shop drains during the late 1960's and early 1970's (refer to Appendix G for a complete listing). Contract hauling of the waste POL off the base was started in 1972. RCRA, Part A, applications have been filed for those separators considered to collect potentially hazardous wastes (refer to Appendix Table D-1).

3. POL Storage and Maintenance

A variety of jet aircraft have been stationed at Nellis AFB since the early 1950's, and major storage facilities have been provided for JP-4 fuel. Prior to and during the early 1950's more than 100 single- and multi-engine piston-driven aircraft were stationed at Nellis AFB, and an aqua-injection AVGAS system was used for leaded fuel storage and distribution. The aqua-system tanks are still used for fuel storage. Tanks currently used for POL storage are listed in Appendix Table E-1. No abandoned tanks were identified at Nellis AFB

The fuel bulk storage tanks have been cleaned three times since 1951. Approximately 25,000 gallons of sludge have been deposited in the base landfills. Until the early 1970's, management practices allowed the draining of approximately 100 gallons of liquid per year from each bulk storage tank to the ground for water removal.

Except for the few sites described in Part B of this section, no major fuel spills or leaks were reported. Minor spills have occurred in many storage and dispensing areas. Hydrazine spills of less than 1 quart may have occurred as many as three times in the last 3 years; containment and neutralization procedures were followed, however, for the only verified spill.

4. Ordnance Inactivation and Disposal

No EOD activities have occurred on Nellis AFB proper. A proficiency range is located in Area II, but ordnance is not disposed of in the area. A practice airfield for rapid runway repair exercises was established south of the base, but no ordnance disposal was reported. Generally, munitions residue is disposed of on the ranges. Refer to Section VII for a discussion on EOD activities at the small arms range.

5. Fire Training

Fire training activities have taken place at Nellis AFB since the early 1950's. Prior to the mid-1970's, the majority of waste POL generated on base was burned in fire training exercises. Only clean fuels have been burned in recent years. The soil around the existing fire training pit has been periodically scraped up and spread in the surrounding area. The area appears clean. Two other fire training areas were reported but could not be visually identified in the field.

6. PCB Management

PCB's have typically been used in insulating oils for electric transformers. Tests conducted in 1981 showed that 2 of 85 out-of-service transformers had PCB levels between 50 and 500 mg/l. Out-of-service transformers are stored between buildings 815 and 817. No spills have occurred in at least 6 years. Fifteen unserviceable transformers were given to DPDO for contract disposal in the past 2 years. No reports were made of transformer disposal in the base landfills, but such past disposal is possible.

Two 10,000-gallon aboveground tanks at facility 2002 contain waste oils with significant PCB levels. One tank contains 9,000 gallons of heavy asphalt with a PCB level of 139 to 150 mg/l based on contractor and USAF OEHL analyses. The other contains 2,000 gallons of light road oil with a PCB level of 20 to 106 mg/l based on similar analyses. Leakage of the tanks was not reported, and efforts are underway to dispose properly of the waste oils through DPDO.

7. Pesticide Usage

Herbicides and other pesticides are applied on base for weed, insect, and other pest control. Herbicides currently in use include krovar, paraquat, and princep while insecticides include diazinon, malathion, and chlordane (Appendix Table J-1).

Currently, herbicides and soil sterilants are applied to fence lines, airfield perimeters, and pavement areas as needed. Insecticides are used as needed in Air Force structures and housing areas.

Rodenticides such as Promar are used in some Air Force structures including the water systems annex. Avitrol, once used in controlling birds in the hangars, has been replaced by a falconry program. Ten pounds of Avitrol (USEPA Hazardous Waste Number P008) are currently stored in the Entomology Shop (building 817).

Historically, DDT and lindane were used in housing areas and around garbage collection areas for insect control. The use of DDT was discontinued in the early 1960's.

Disposal methods used by Entomology included dumping outdated full barrels and empty unrinsed barrels of pesticide (including DDT) into the base landfills. The majority of empty bags were burned until approximately 1981. Some torn bags and rinsed containers were disposed of in the base landfills.

Present entomology operations follow approved procedures in pesticide application and disposal of empty containers. According to Civil Engineering memorandums, washdown wastes are discharged directly to the sanitary sewer system. A work order is pending for the installation of a 750-gallon holding tank at the shop.

8. Wastewater Collection and Treatment

A storm drain running down the apron, across the southwest end of the flight line, and through the golf course and landfill collects runoff from the shop and flight line areas. This runoff contains some waste POL, and past dumping of fuels and

spent solvents into the storm drain was reported. Field observation indicated that waste fuel and hydraulic fluid dumping still occurs. This was reported to the base environmental program. Direct shop discharge to the storm drain apparently has not occurred but the observed flow in the drain was constant on a dry day. This flow was attributed to a water line leak.

Sanitary and shop wastes at Nellis AFB are collected in the sanitary sewer system. As previously discussed, oil/water separators have been provided on many of the shop discharge lines since the early 1970's. Since 1972, the base sewage has been discharged to a Clark County regional wastewater treatment plant.

From 1952 until 1972, the sewage was treated in the base sewage treatment plant (STP) located south of the existing golf course. Primary clarification, biological treatment using a trickling filter, and effluent disposal via percolation ponds and irrigation of the golf course was provided. Anaerobic sludge digestion was used to stabilize the primary and secondary sludges. The digested sludge was reportedly used as a soil conditioner in various areas of the base and specific disposal areas could not be identified.

Prior to 1952, base sewage was treated in a trickling filter plant lcoated near building 174. Effluent was discharged through a gully leading to the storm drain. Each of these STP sites is discussed in Part B of this section.

Sanitary wastes from Area II have been treated in an on-site Imhoff tank since with effluent being discharged to percolation ponds. A septic system is still in use for auto hobby shop wastes. Each of these sites is also discussed in Part B of this section.

9. Other Activities

Two radioactive waste sites in Area II and a possible radioactive waste pit on the base were reported and are discussed in Part B. No evidence was found concerning the use of or manufacture of biological warfare agents.

Landfill disposal of low-level radioactive wastes and pharmaceuticals from the hospital was reported. Pathological wastes have been incinerated since construction of the hospital in 1965. Infirmary pathological wastes were landfilled prior to that time.

B. DISPOSAL SITES IDENTIFICATION AND RATING

Interviews with 48 past and present base personnel resulted in the identification of 33 disposal or spill sites at Nellis AFB (including Areas II and III), 5 disposal sites at the Nellis AFB small arms range, and 7 disposal sites at Indian Springs AFAF. The sites included 4 current and 8 former landfill areas, 9 demolition disposal or dump areas, 6 current and 10 former liquid or semi-solid waste disposal areas, 5 major spill areas, and 3 areas where wastes with unknown physical characteristics were disposed of.

A brief description of each site found at Nellis AFB (including Areas II and III) follows. The sites are shown in Figures 11, 12, and 13. Approximate dates of major disposal site usage are shown in Figure 14. The sites identified on the small arms range and at Indian Springs AFAF are shown and discussed in Sections VII and VIII, respectively. Photographs of several sites are presented at the conclusion of this report.

Site No. 1 (Figure 11) - Landfill located south of the golf course near the south boundary. Except for the period between 1968 and 1974, this area has been used as the base landfill since 1942. Essentially all types of solid wastes generated on base have been disposed of in the landfill. Potentially hazardous wastes could include paint, thinners, solvents such as MEK and TCE, and waste POL. The fill was reported to have extended under a portion of the golf course although no direct evidence of differential settlement was observed. A strip on the west side of the road leading into the landfill was reputed to contain demolition debris only, but field observation indicated that miscellaneous containers had also been placed in this area. Trench and area fill techniques have both been used on the site. The fill was burned regularly until the mid-1960's, using waste POL. Accidental fires have occurred at least three times since then. The characteristics of the wastes disposed of at this site are potentially hazardous, and migration is possible because of the disposal of liquids and irrigation at the golf course (with STP effluent prior to 1972). Also, the base storm drain gully runs through the fill area. Rating is required for this site.

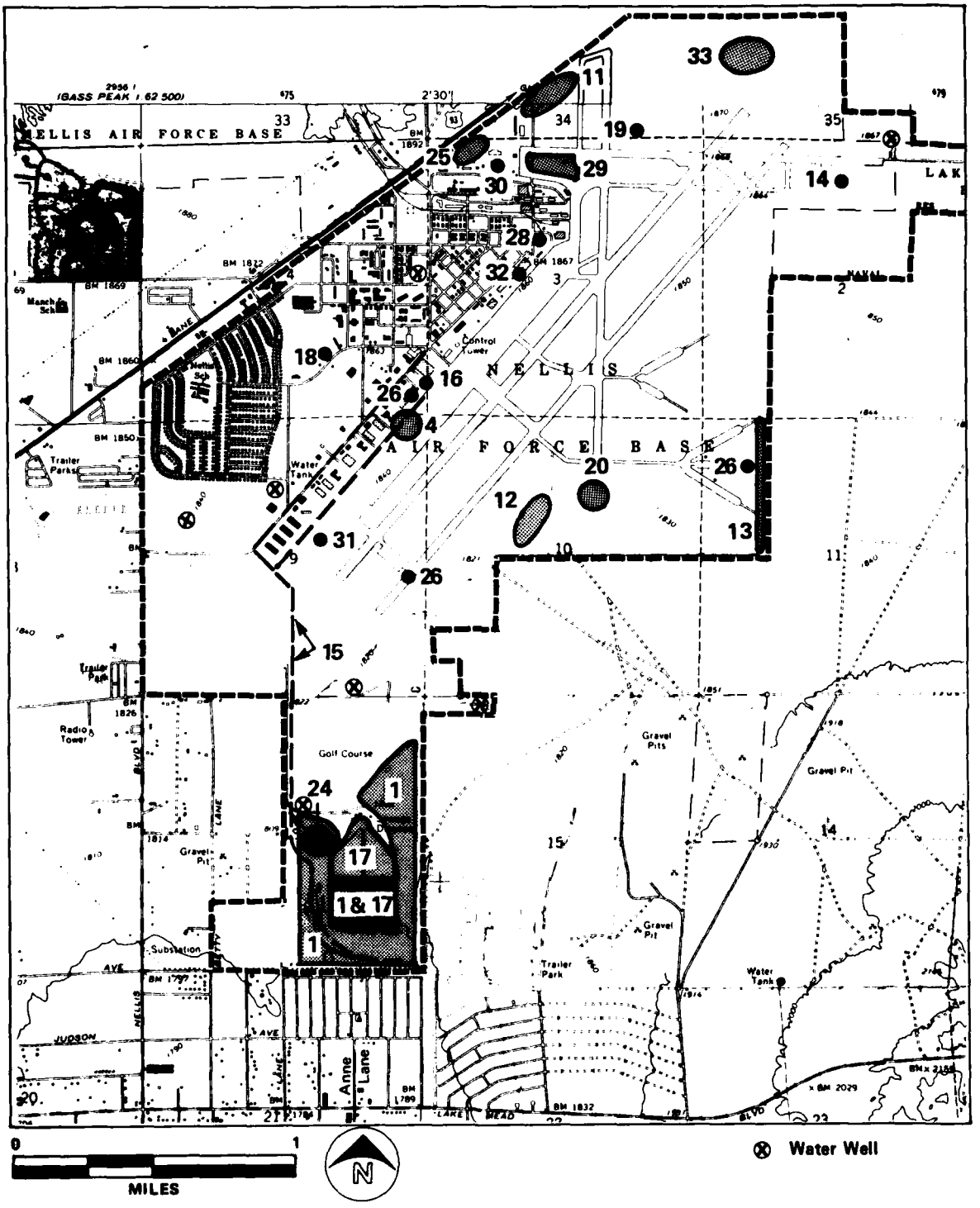


FIGURE 11
NELLIS AFB
WASTE DISPOSAL SITES

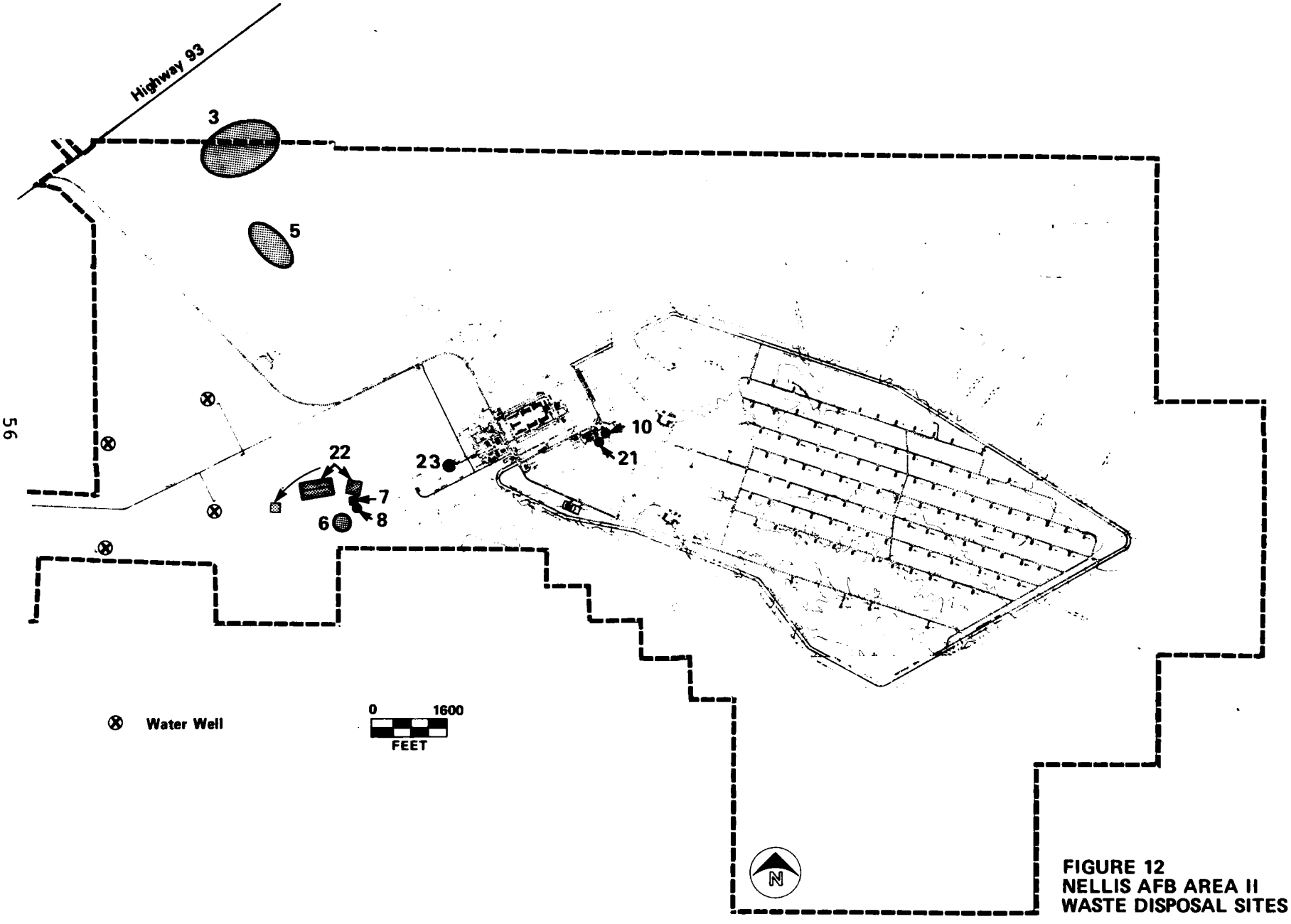


FIGURE 12
NELLIS AFB AREA II
WASTE DISPOSAL SITES

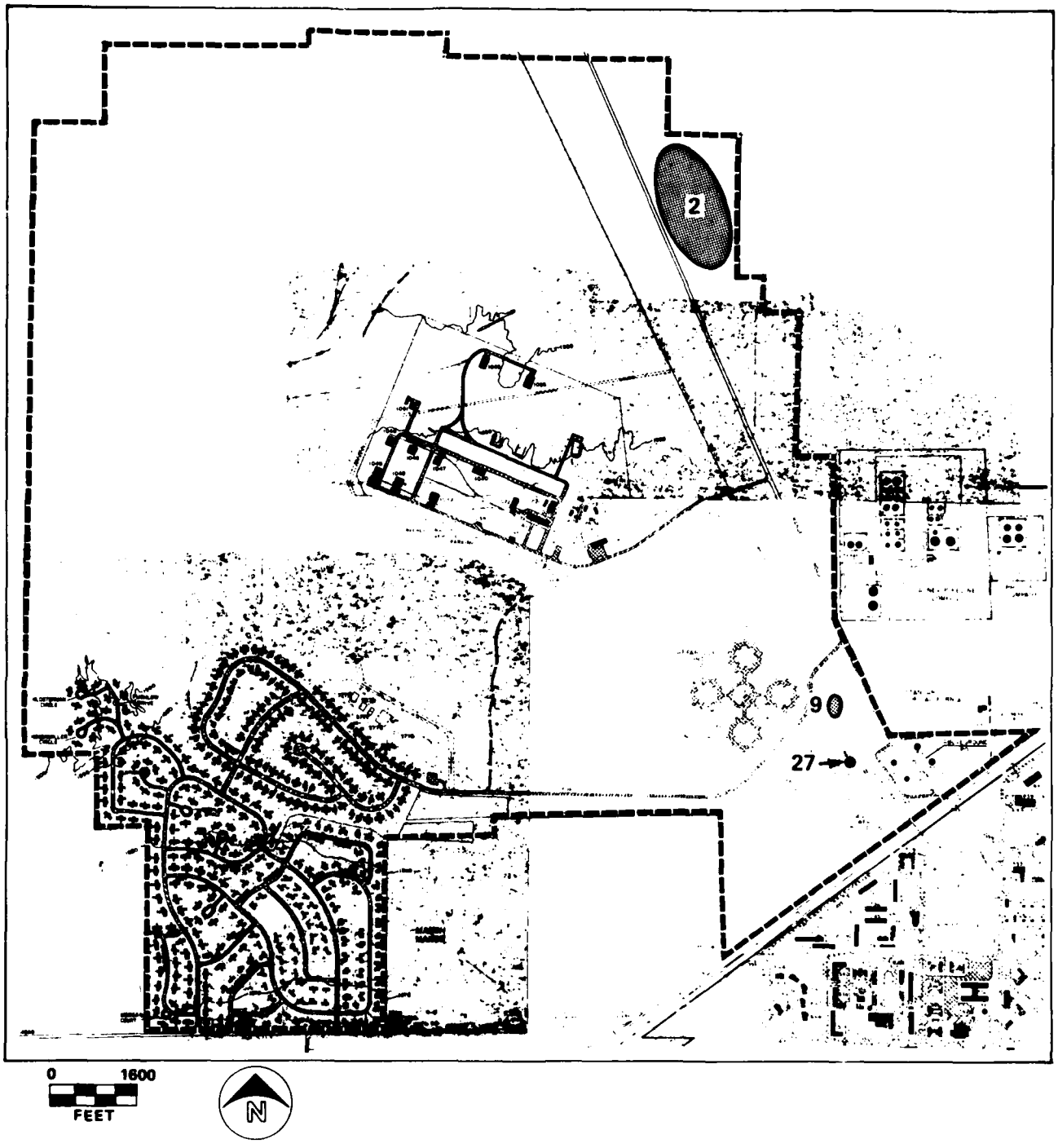


FIGURE 13
NELLIS AFB AREA III
WASTE DISPOSAL SITES

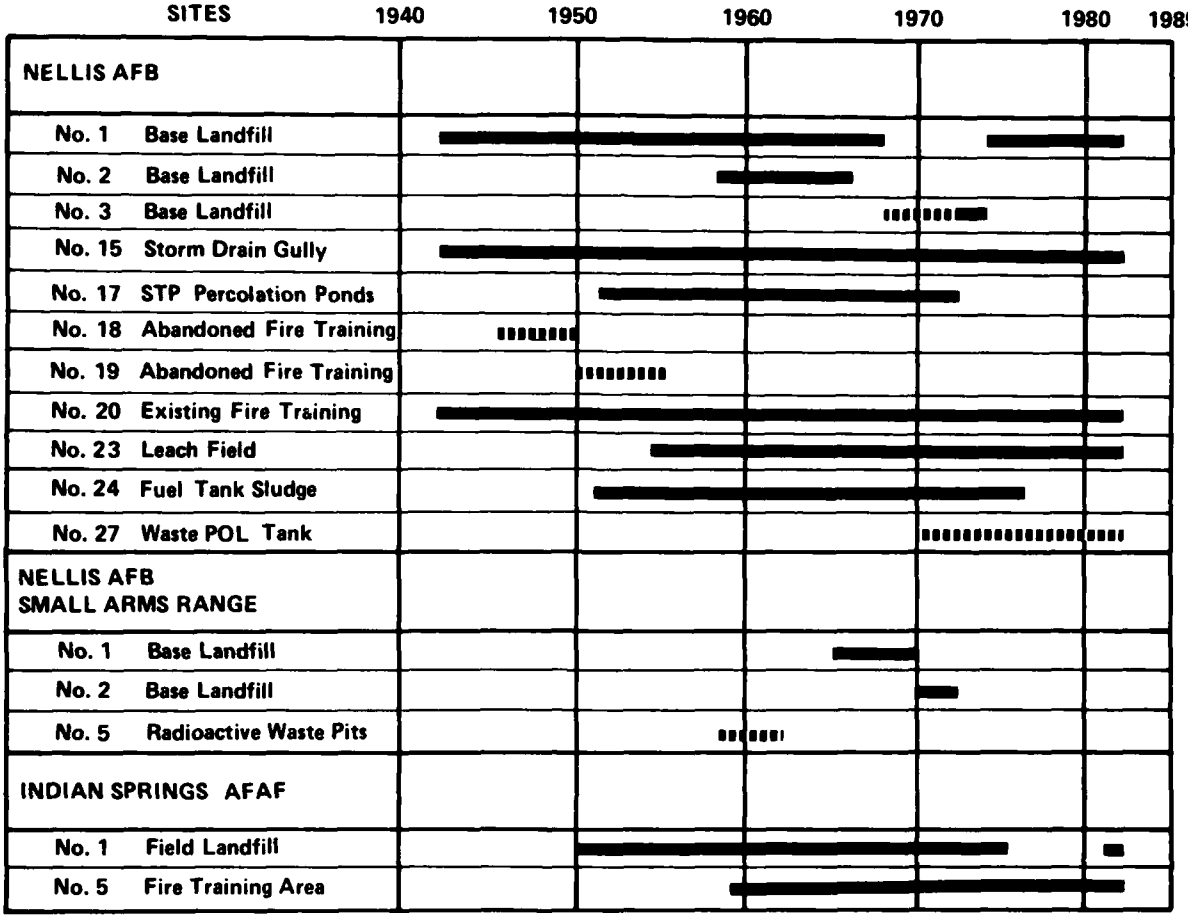


FIGURE 14
HISTORICAL SUMMARY OF
ACTIVITIES AT MAJOR DISPOSAL SITES ON
NELLIS AFB, NELLIS AFB SMALL ARMS RANGE, AND
INDIAN SPRINGS AFAF

Site No. 2 (Figure 13) - Landfill area on the east side of the road leading from Area III toward the small arms range. This area was used for the disposal of demolition debris and miscellaneous refuse from 1958 until 1966. Several wooden buildings were buried in the southern portion of the landfill in 1966. Paint sludge from the spray booths may have been regularly disposed of in this area. The operational period for this site overlaps that of Site No. 1, but all types of waste from the base are suspected of being landfilled in this area. Trench and area fill techniques have both been used on the site. The characteristics of the waste may be hazardous, and migration is possible because of the disposal of liquids. Rating is required for this site.

Site No. 3 (Figure 12) - Landfill located on the south side of Highway 93 north of the road to Area II. This area served as the base landfill from 1972 until 1974. The landfill was closed because it was located partially on BLM and private property. Some reports indicated that the site may have been used as early as 1968. Wastes disposed of in the site were similar to those of Sites No. 1 and 2. Waste oil and tire burning was reported. The characteristics of the wastes disposed of are potentially hazardous, and migration could occur because of the disposal of liquids. Rating is required for this site.

Site No. 4 (Figure 11) - Landfill south of building 174. Demolition debris was disposed of in this area during the mid-1940's. The characteristics of the wastes are not considered hazardous, and rating is not required.

Site No. 5 (Figure 12) - Landfill located between Area II and Highway 93 on the east side of the road. This still-active area appears to have been used since the mid-1970's for the unauthorized disposal of construction debris, materials, and waste supplies from RED HORSE operations. The wastes are disposed of in borrow pits. A small number of full and empty drums containing non-hazardous materials and paint containers were observed. The characteristics of some of the wastes are potentially hazardous, but the suspected quantity does not pose a migration threat because of the low precipitation and high evaporation. Rating is not required for this site and the unauthorized use has been reported to the base environmental program for action.

Site No. 6 (Figure 12) - Burial pit located southwest of the sewage treatment plant for Area II. This still-active area appears to be used for the unauthorized disposal of general refuse from Area II. The wastes are disposed of in a borrow pit. The characteristics of some of the wastes could be hazardous; but because of the low levels of industrial activity in Area II, the suspected quantity does not pose a migration threat. Rating is not required for this site, and the unauthorized use has been reported to the base environmental program for action.

Site No. 7 (Figure 12) - Landfill located southwest of the sewage treatment plant for Area II. This area may have been used by the Navy base at Area II. Observed settlement indicated the existence of a relatively old landfill. The site is a trench-type fill and may have been used as early as 1954. Whether or not the site was used following Air Force occupancy of the area could not be determined. Major maintenance activities at

Area II were limited to upkeep of a few vehicles. The characteristics of some of the wastes generated could be hazardous; but because of the small quantities, low precipitation, and high evaporation, migration is not anticipated. Rating is not required for this site.

Site No. 8 (Figure 12) - Unauthorized burial pit located adjacent to Site No. 7 southwest of the Area II sewage treatment plant. A small number of miscellaneous empty drums and containers were observed in this area. The characteristics of the residue could be hazardous, but migration is not anticipated because of the minute quantities, low precipitation, and high evaporation. Rating is not required for this site and the unauthorized use has been reported to the base environmental program for action.

Site No. 9 (Figure 13) - Burial pit along the railroad track northwest of the POL area north of Highway 93. Miscellaneous drums and cans were apparently emptied and flattened prior to disposal. The characteristics of residue in the containers may be hazardous, but migration is not anticipated because of the small quantities, low precipitation, and high evaporation. No signs of environmental stress were observed and rating is not required for this site.

Site No. 10 (Figure 12) - Burial area located at facility 10309 in Area II. Dry radioactive wastes resulting from weapons maintenance are buried in this controlled area. No information was available on the quantity of wastes buried, but the site was established in 1954. The radioactivity levels of the wastes are suspected to be low. Surface alpha, beta, and gamma levels exceeding those of the background have not been detected. The

characteristics of the suspected wastes are potentially hazardous but, because of the low precipitation and high evaporation, migration is not anticipated. Rating of this site is not required.

Site No. 11 (Figure 11) - Dump area located north of the engine test cell. Demolition debris was dumped in this area primarily during the late 1950's to serve as a sound attenuator for the engine test cell. Debris is still periodically disposed of in the area. The characteristics of the waste are not hazardous, and rating is not required.

Site No. 12 (Figure 11) - Surface dump area located west of the existing fire training area. Demolition debris was dumped in this area, probably during the 1960's. The characteristics of the wastes are not hazardous, and rating is not required.

Site No. 13 (Figure 11) - Surface dump area located east of the existing fire training area. Demolition debris was dumped in this area, probably during the 1960's. The characteristics of the wastes are not hazardous, and rating is not required.

Site No. 14 (Figure 11) - Liquid disposal area east of the overrun for runway 3. Reportedly, small quantities of miscellaneous liquid wastes were poured on the ground in this small area during the 1960's and early 1970's. Ten gallons of carbon tetrachloride were reported to have been disposed of in 1970. The area was reported to be smooth and bare at that time, but disturbances were no longer observable. The characteristics of the liquid wastes that may have been disposed of in this area are potentially hazardous. Migration or current

problems caused by the diposal of these wastes are not anticipated because of the suspected small quantities, low precipitation, and high evaporation. Rating is not required for this site.

Site No. 15 (Figure 11) - Storm drain gully originating near the southwest end of the flight line and extending south through the golf course. Surface runoff from the base, including the shop areas and flight line, is collected in the storm drainage system and discharges to the open gully near the south end of the flight line. No shop drains have ever been connected to the storm drainage system, but evidence of unauthorized waste fuel and hydraulic fluid disposal was observed as was a continuous dry weather flow that was attributed to a water line leak. Effluent from the original sewage treatment plant discharged through a section of the storm drain and this effluent did contain shop wastes such as solvents, carbon removers, and paint strippers, as described in Section A of this chapter. Runoff from the flight line area contains potentially hazardous substances, and indiscriminate liquid waste dumping has occurred in the past. Rating is required for this site because of the possible migration of hazardous wastes.

Site No. 16 (Figure 11) - Original sewage treatment plant located near building 174. Sanitary and some industrial wastes were treated at the original sewage treatment plant using trickling filters prior to 1952. The treated effluent was discharged to the storm drain gully (Site No. 15). Specific sludge disposal areas could not be determined, but the sludge was reportedly used as a soil conditioner in various areas around the base. Small quantities of potentially hazardous wastes were collected in the sanitary sewer system, and effluent

polishing using oxidation/percolation ponds was not provided. Evidence of this sewage treatment operation is no longer discernible; and because some biological treatment was provided, no harmful effects are anticipated in the immediate area as a result of the disposal of potentially hazardous wastes. The discharge drain ditch is included in the rating for Site No. 15. Rating is not required for this site.

Site No. 17 (Figure 11) - Sewage treatment plant located south of the golf course. Secondary wastewater treatment using trickling filters followed by effluent disposal in percolation ponds and by golf course irrigation was provided at this plant from 1952 until 1972 when the base sanitary sewage system was connected to the county system. Several industrial operations (refer to Tables IV-1 and IV-2) discharge to the sanitary sewer, and potentially hazardous wastes were undoubtedly discharged to the treatment plant. Long detention times associated with percolation ponds result in high degrees of hazardous contaminant inactivation, but trace organics could remain. High nitrate levels have been detected in a monitoring well located down-gradient from the area. On-site sewage treatment for a nearby trailer park could be a source of the high nitrates. This could also be an indication of contaminant migration from the percolation ponds or could be due to irrigation of the golf course. Primary and secondary sludges were digested before disposal. Heavy metal contamination would be the major sludge contaminant problem, and dilution by the sanitary sewage and the lack of a major plating operation minimize this concern. The digested sludge was reportedly used as a soil conditioner in various areas around the base. A portion of the sludge drying and percolation pond areas is now being used as

a landfill extension (Site No. 1). Rating of this site is required because of the potential contaminant migration from the percolation ponds.

Site No. 18 (Figure 11) - Fire training area east of building 503. An unsubstantiated report was made of the burning of 500 gallons per month of waste POL in this area during the late 1940's. The majority of potentially hazardous wastes would have been burned, and no remaining evidence of such usage was discernible. Rating of this site is still required, though, because of the environmental sensitivity of fire training areas.

Site No. 19 (Figure 11) - Fire training area north of the primary arm and disarm area on the northwest end of the base. An individual unsubstantiated report was made of fire training in this area during the early 1950's. Potentially hazardous liquids may have been dumped; but most would have been burned, and no evidence of such usage was discernible. Rating of this site is still required, though, because of the evironmental sensitivity of fire training areas.

Site No. 20 (Figure 11) - Fire training area located south of the Class 1 arming area. Fire training has been conducted in this area since the early 1950's. Only clean fuels have been burned since the late 1970's. Prior to 1972, as much as 10,000 gallons per month of waste POL were burned. This was reduced to 300 gallons per month after 1972 because the majority of waste POL was hauled off base. The fire training area soils are periodically scraped up and mixed with the surrounding soils (landfarmed), and the area is extremely clean. Landfarming permits biological decomposition of the remaining contaminants, and migration of potentially

hazardous wastes is less likely because of the low precipitation and high evaporation. Rating of this site is required, though, because of the environmental sensitivity of fire training areas.

Site No. 21 (Figure 12) - Liquid radioactive waste storage area in the secure section of Area II. A 500- to 1,000-gallon lined, underground tank is used for the disposal of radioactive laboratory wastes. As with the solid radioactive waste site (Site No. 10) already described, surface levels of alpha, beta, and gamma radiation are not above background levels. Detailed information concerning subsequent disposal of this residue or past leakage was not available. Migration of the waste is not anticipated as long as the tank is in good condition. Rating of this site is not required, and recommmendations have been made to the base environmental program to determine the contents and condition of the tank.

Site No. 22 (Figure 12) - Sewage treatment plant for Area II. Sanitary sewage and a small quantity of industrial wastewater originating in Area II are treated in an Imhoff tank followed by percolation ponds. A small pit for bar screen wastes is located near the Imhoff tank area. Industrial activity (vehicle maintenance) has been relatively low in Area II. A small quantity of potentially hazardous waste may have been discharged to the sewage treatment plant; but because of the long detention time in the percolation pond, no adverse effects are anticipated. Rating is not required for this site.

Site No. 23 (Figure 12) - Septic tank leach field for the auto hobby shop in Area II. Sanitary sewage and

moderate quantities of waste POL are discharged to the septic system. Before the institution of oil recovery programs in the early 1970's, larger quantities of waste POL may have been discharged. The total quantity of potentially hazardous wastes generated from vehicle maintenance in Area II was small compared to Nellis AFB proper, but migration of these liquid wastes is possible. Rating of this site is required.

Site No. 24 (Figure 11) - Sludge disposal area located in the north end of the the landfill south of the golf course (Site No. 1). This area may have been used for the disposal of STP sludge and leaded fuel storage tank cleaning residue. Sanitary sewage sludge could have been disposed of at any time between 1942 and 1972. Leaded tank sludges were probably deposited when the aqua-system tanks were converted to JP-4 fuel storage in the early 1950's. Since 1951, as much as 25,000 gallons of JP-4 sludge and leaded gasoline sludge (including rinse water) have been landfilled. The total quantity at this site was unidentifiable. The tanks were last cleaned in 1976. Potentially hazardous wastes may have been disposed of in this area, and migration is possible because of the liquid state. Rating is required for this site.

Site No. 25 (Figure 11) - Liquid disposal area located north of building 830. Waste POL was reportedly spread (landfarmed) on this area during the mid-1960's. Evidence of such usage is no longer discernible. The wastes disposed of were potentially hazardous; but because of the low precipitation and high evaporation, migration was not likely. Rating is not required for this site.

Site No. 26 (Figure 11) - Three possible washdown areas located at the overrun of runway 21L, on the east end of the Class 1 munitions arming area south of the runway, and southwest of building 175. Each of these areas was reported to be a washdown site for one or more aircraft that had passed through radioactive dust clouds during the early 1960's. Surface radioactivity has not been checked or reported in any of the areas. Wastewater generated by the washdown may have been hazardous; but positive identification of the sites was not possible, and evidence of such usage no longer remains. The radioactive constituents of the wastewater would have decayed rapidly and rating is not required for this site.

Site No. 27 (Figure 13) - Tank leak at facility 1014. Approximately 50 gallons per month of waste POL and solvents have been leaking from the southernmost of four partially buried 20,000-gallon waste POL storage tanks. This leakage was recently identified and may have been occurring for several years. Corrective actions have been taken. The concrete tanks have been in place since 1942 and were formerly used for heating oil storage. The wastes leaking from the tank are potentially hazardous. Evidence of the leak was observable on the surface, and migration of these liquids could occur. Rating is required for this site.

Site No. 28 (Figure 11) - Fuel spills in the dispensing area located near building 941. Two 2,000-gallon JP-4 fuel spills were identified in this area within the last 15 years. Each spill was contained inside a diked area and allowed to evaporate and percolate into the soil. The wastes were potentially hazardous, and contaminant migration to the groundwater could have occurred. Rating is required for this site.

Site No. 29 (Figure 11) - Fuel spill area located on the apron north of building 805. A 25,000-gallon JP-4 spill was reported to have occurred in 1954. The spill residue was flushed away from the apron to a storm drain using 125,000 gallons of water. High evaporation rates and the length of time since the spill make it unlikely that any harmful effects remain. Specific rating is not required for this site because the residue collected in the storm drain system is addressed in Site No. 15.

Site No. 30 (Figure 11) - Fuel spill near building 830. A leak of 600 gallons of MOGAS in 3 months was attributed to a bad pipe connection in this area approximately 2 years ago. Subsequent excavation of the site 1 year ago showed that no evidence of the spill remained. Low precipitation and high evaporation make migration of a spill of this magnitude unlikely. Rating is not required for this site.

Site No. 31 (Figure 11) - Waste disposal pit located under the apron south of facility 2098. Two or three gallons of radioactive waste were reported to have been disposed of in an auger hole during 1960. The nature of the waste is potentially hazardous and, if in liquid form, the waste could migrate. Rating is not required for this site, however, because of the absorptive capacity of the soil, the small amount of contained moisture, and the lack of a significant driving force.

Site No. 32 (Figure 11) - Waste pit located at building 147. An unsubstantiated report was made of a waste disposal pit in this area. Detailed information was not available concerning the nature of the wastes or whether the area was used for storage or disposal. The location of building 147 on the flight line is an indication

that waste POL may have been placed there. No evidence of such usage could be obtained, and rating of the site is not warranted.

Site No. 33 (Figure 11) - Surface dump area located north of the northeast end of runway 21. This apparently active area is reportedly used by Civil Engineering for the disposal of construction debris, empty containers, and construction supplies. The characteristics of a small portion of the wastes could be hazardous, but migration of such small quantities is not anticipated because of the low precipitation and high evaporation. Rating is not required for this site.

Site rating using the modified JRB Associates system was conducted on those sites considered to have the potential for environmental concern. A complete listing of disposal sites is presented in Table IV-3. Sites determined to require numerical rating are so indicated. The Small Arms Range and Indian Springs AFAF sites presented here are discussed in Sections VII and VIII, respectively.

The rating system consists of 26 rating factors that are divided into four categories: receptors, pathways, waste characteristics, and waste management practices that are used to evaluate the principal targets of contamination, the mechanisms for migration, the hazards posed by the contaminants, and the facility's design and operation, respectively. Relative sources from each category are combined to give an overall score using appropriate weighting factors. A more detailed description of this hazard rating methodology is included in Appendix H.

Numerical results for each rated site are presented in Table IV-4. Copies of the rating forms for each site are included in Appendix I.

Table IV-3
DISPOSAL SITE RATING SUMMARY

Site	Waste Type	Potential Hazard		Rating
		Contamination	Migration	
Nellis AFB				
1	Industrial, Domestic	Yes	Yes	Yes
2	Industrial, Domestic	Yes	Yes	Yes
3	Industrial, Domestic	Yes	Yes	Yes
4	Demolition	No[a]	NA	No[c]
5	Demolition, Industrial	No[a]	NA	No[c]
6	Industrial, Domestic	No[a]	NA	No[c]
7	Industrial, Domestic	No[a]	NA	No[c]
8	Industrial	No[a]	NA	No[c]
9	Industrial	No	NA	No
10	Radioactive	Yes	No	No
11	Demolition	No	NA	No
12	Demolition	No	NA	No
13	Demolition	No[a]	NA	No
14	Solvents	No[a]	NA	No
15	POL, Solvents	Yes	Yes	Yes
16	Sanitary, POL, Solvents	Yes	No	No
17	Sanitary, POL, Solvents	Yes	Yes	Yes
18	POL, Solvents	Yes	Yes	Yes
19	POL, Solvents	Yes	Yes	Yes
20	POL, Solvents	Yes	Yes	Yes
21	Radioactive	Yes	No	No[c]
22	Sanitary, POL	Yes	No	No
23	Sanitary, POL	Yes	Yes	Yes
24	Fuels, Sanitary	Yes	Yes	Yes
25	POL	Yes	No[b]	No
26	Radioactive	Yes	No[b]	No
27	POL, Solvents	Yes	Yes	Yes
28	Fuels	Yes	Yes	Yes
29	Fuel	Yes	No[b]	No
30	Fuel	No[a]	NA	No[c]
31	Radioactive	Yes	No	No[c]
32	POL	Yes	No	No
33	Construction, Demolition	Yes	No	No
Small Arms Range				
1	Industrial, Domestic	Yes	Yes	Yes
2	Industrial, Domestic	Yes	Yes	Yes
3	Ordnance	Yes	No	No
4	Ordnance	Yes	No	No
5	Radioactive	Yes	Yes	Yes
Indian Springs AFAF				
1	Industrial, Domestic	Yes	Yes	Yes
2	Debris	No	NA	No
3	Domestic	No[a]	NA	No
4	Sanitary, POL	No[a]	NA	No
5	POL	Yes	Yes	Yes
6	Radioactive	Yes	No[b]	No
7	POL	No[d]	NA	No

NA = Not applicable using decision tree methodology.

[a] Hazardous wastes not generated in quantity sufficient for contamination.

[b] No current migration caused by past potential contamination.

[c] Referred to base environmental program.

Table IV-4
SUMMARY OF SITE ASSESSMENT RESULTS

Site	Site Description (weighting factor)	Subscores (percent of maximum possible score in each category) Receptors	Pathways	Waste Characteristic	Waste Management Practices	Overall Score (weighted average)
Nellis AFB						
1	Base Landfill	61	24	90	77	61
2	Base Landfill	39	11	70	57	42
3	Base Landfill	24	11	70	57	39
15	Storm Drain Gully	59	11	80	74	54
17	STP Percolation Ponds	61	37	60	65	55
18	Abandoned Fire Training	38	9	60	55	39
19	Abandoned Fire Training	38	9	60	55	39
20	Existing Fire Training	43	9	80	62	46
23	Leach Field	49	9	50	65	41
24	Fuel Tank Sludge	62	25	70	69	54
27	Waste POL Tank	49	12	60	43	36
28	JP-4 Spill Area	43	9	80	57	45
Nellis AFB Small Arms Range						
1	Base Landfill	24	13	70	46	33
2	Base Landfill	24	13	70	46	33
5	Radioactive Waste Pits	24	13	50	52	34
Indian Springs AFAF						
1	Field Landfill	24	11	70	69	42
5	Fire Training Area	53	9	70	60	43

V. CONCLUSIONS

A. No direct evidence was found to indicate that migration of hazardous contaminants beyond the Nellis AFB boundaries exists. High nitrate levels were observed in a USGS well located down-gradient from the abandoned sewage treatment percolation ponds (Site No. 17). The presence of private septic systems near the well may influence the nitrate levels, or lateral migration of sewage effluent may have occurred in the past.

B. Information obtained through interviews with 48 past and present base personnel and through field observation indicates that hazardous wastes have been disposed of on Air Force property at Nellis AFB.

C. Industrial activity at Nellis AFB consists primarily of routine vehicle, aircraft, and ground support equipment maintenance. Nellis AFB is one of the largest Tactical Air Command bases, and a relatively high number of aircraft are stationed there. Generation of large quantities of hazardous wastes has not occurred in comparison to bases having significant aircraft rework and maintenance missions. The potential for a large-scale contamination problem is considered to be low.

D. Low precipitation, high evaporation, the absence of major surface waters, and moderately deep groundwater levels limit the possible pathways for hazardous contaminant migration. The sand and gravel content of the sediments underlying the base is low, and therefore the permeability is low. Subsidence fissures could provide direct pathways for migration of contaminants to the groundwater, but no evidence of such fissuring was

discernible near any disposal areas. The potential for significant hazardous contaminant migration is low.

E. Table V-1 presents a priority listing of the rated sites. One general area has been identified as having the highest potential for environmental concern. This area consists of a major base landfill (Site No. 1), the STP percolation ponds (Site No. 17), the fuel tank sludge disposal area (Site No. 24), and the storm drain (Site No. 15). The storm drain could act as a driving force for contaminant migration.

F. The remaining sites are not considered to present significant environmental concerns. This includes the base landfill (Site No. 3), which is partially on BLM and private land. The quantity of hazardous wastes disposed of in this site is low, and the migration pathways are negligible.

Table V-1
PRIORITY LISTING OF DISPOSAL SITES[a]
NELLIS AFB, NELLIS AFB SMALL ARMS RANGE,
INDIAN SPRINGS AFAF

Site Number	Description	Overall Score
1	Base Landfill	61
17	STP Percolation Ponds	55
24	Fuel Tank Sludge	54
15	Storm Drain Gully	54
20	Existing Fire Training	46
28	JP-4 Spill Area	45
5 (Indian Springs)	Fire Training Area	43
1 (Indian Springs)	Field Landfill	42
2	Base Landfill	42
23	Leach Field	41
18	Abandoned Fire Training	39
19	Abandoned Fire Training	39
3	Base Landfill	39
27	West POL Tank	36
5 (Small Arms Range)	Radioactive Waste Pits	34
1 (Small Arms Range)	Base Landfill	33
2 (Small Arms Range)	Base Landfill	33

[a]Includes rated sites for all Nellis AFB properties.

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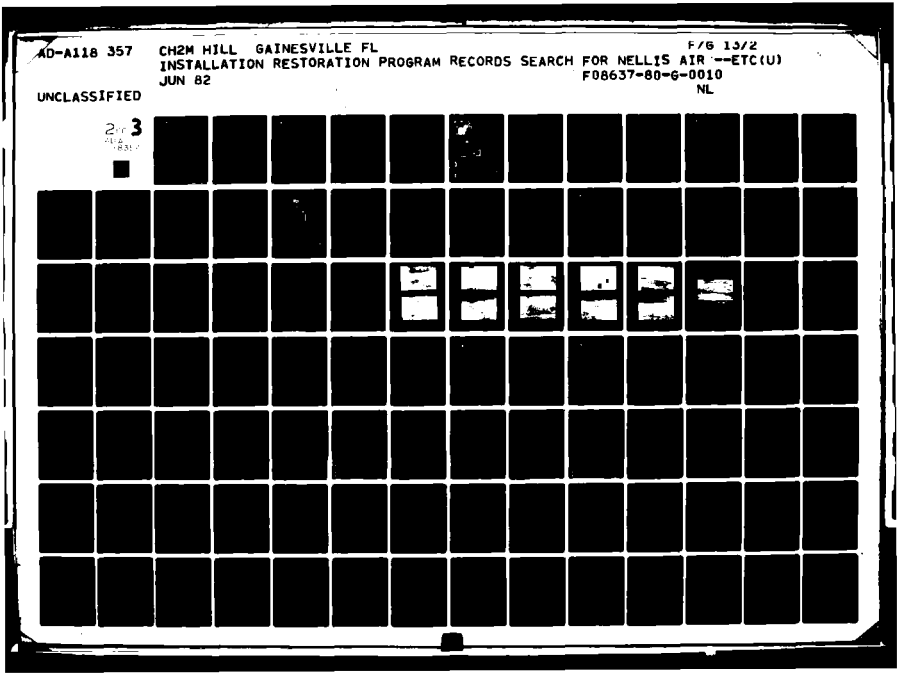

VI. RECOMMENDATIONS

A. A limited monitoring program is suggested to confirm the absence of hazardous contaminant migration. Significant health hazards have not been identified, and no urgent need for the monitoring program exists. The priority for monitoring at Nellis AFB is considered moderate.

B. Monitoring is suggested for the disposal area south of the golf course consisting of Sites No. 1, 17, 24, and 15, as described in paragraph E of the conclusions. Two groundwater monitoring wells should be installed down-gradient from the area along the southern base perimeter, and a background water quality monitoring well should be installed north of the golf course away from the potential influence of the drainage ditch (Site 15). Based on the available information, the wells should be 50 to 100 feet deep. Samples from these three wells plus the existing USGS monitoring well discussed in Section III and the existing base water well south of the golf course should be analyzed for volatile organic compounds (TCE, MEK), gross contaminants (TOC, COD, oil and grease, pH, specific conductance, nitrate), heavy metals (chromium, lead, cadmium, silver), and pesticides (DDT).

C. Specific details of the limited Phase II program outlined above should be finalized during the initial stages of Phase II. It is not the intent of Phase I to assess the exact location or depth of any groundwater monitoring wells. In the event that contaminants are detected in the water samples collected from any of the wells, a follow-on field survey program should be implemented to determine the extent of the contaminant migration. The

Phase II contractor should be responsible for evaluating the results of the program outlined above and for recommending additional monitoring, as appropriate.

D. The following recommendations were made to the base environmental program:

1. The presence of the California desert poppy (Arctomecon californica) in the base landfill (Site No. 2) should be confirmed.

2. The cause of the continuous storm drain flow should be verified and stopped to remove this potential driving force for contaminant migration. Measures should be taken to prevent unauthorized dumping into the drain (Site No. 15).

3. Measures should be taken to prevent unauthorized dumping in the burial pits (Sites No. 5, 7, and 8).

4. The condition of the liquid radioactive waste holding tank (Site No. 21) should be determined.

VII. NELLIS AFB SMALL ARMS RANGE ANNEX

A. DESCRIPTION

The Nellis AFB Small Arms Range Annex (also known as the Nellis Flexible Gunnery Range) is located approximately 3 miles north of the base (refer to Figure 1). The range was first established in 1941, inactivated in 1945, and reactivated in 1949. Major activities included air-to-air gunnery training and ground firing using rail-mounted targets. A large portion of the range is no longer active. The pistol range is still in use and a "black-powder" club target area has been established. Parts of the range have already been excessed to the Bureau of Land Management and actions are underway to excess more. (Refer to Figure 15)

B. ENVIRONMENTAL SETTING

1. Meteorology

Meteorological data for the range were not available but should approximate those of Nellis AFB. Refer to Section III for a summary of the meteorological conditions at Nellis AFB.

2. Hydrology and Geology

Hydrologic and geologic considerations for the small arms range are similar to those of Nellis AFB. These factors are discussed in Section III.

3. Environmentally Sensitive Conditions

The vegetation community found on the Nellis AFB small arms range is the typical southern desert scrub with dominant species being creosote-bush, bur-sage, Opuntia cactus, and Mojave yucca. The range is located south of the Las Vegas Range and the Desert National Wildlife Range. A managed population of bighorn sheep occurs in these ranges. The relatively low level of human activity currently in this area makes it attractive to wildlife populations. A potential exists for the presence of the endangered and threatened species listed in Table III-2. The range area is not considered to be sensitive or essential for the existence of these species.

C. FINDINGS

1. Industrial Operations

Based on a review of the range history, the magnitude of industrial activity in the range area was most likely negligible. A concrete oil-change pit for locomotive engines was discovered, indicating that some maintenance did occur in the area. The quantities of potentially hazardous wastes generated were probably low, and no indications of environmental stress resulting from industrial activities was observed.

2. Disposal Sites

Five waste disposal sites were identified on the range. Two of the sites are not related to range

activities and a third may not be. A short description of each site and the rationale for determining whether subsequent rating is necessary follow. The sites are shown in Figure 15. Rating scores were presented in Table V-1.

Transport mechanisms in the vicinity of the range are almost negligible unless liquid wastes are present. Precipitation is low, evaporation is high, and the groundwater table is moderately low (more than 100 feet deep). Possible receptors in the area are also very limited because of the remote setting. Flash flooding could result in the surface transport of waste material; but generally, the quantity of potentially hazardous material found on the surface was small.

Site No. 1 - Landfill located north of the existing south boundary and east of the road to Nellis AFB. This area was used for the disposal of wastes generated from all of Nellis AFB during the last half of the 1960's. Miscellaneous shop wastes including solvents, paints, and lubricants may have been disposed of here. The potentially hazardous characteristics of the wastes and the possibility of migration due to the disposal of liquids cause the need for rating of this site.

Site No. 2 - Landfill located in the third target bunker proceeding from east to west. During the early 1970's, the Nellis AFB landfill was located at this site. Wastes similar to those described for Site No. 1 would have been disposed of here. The total quantity would have been relatively small,

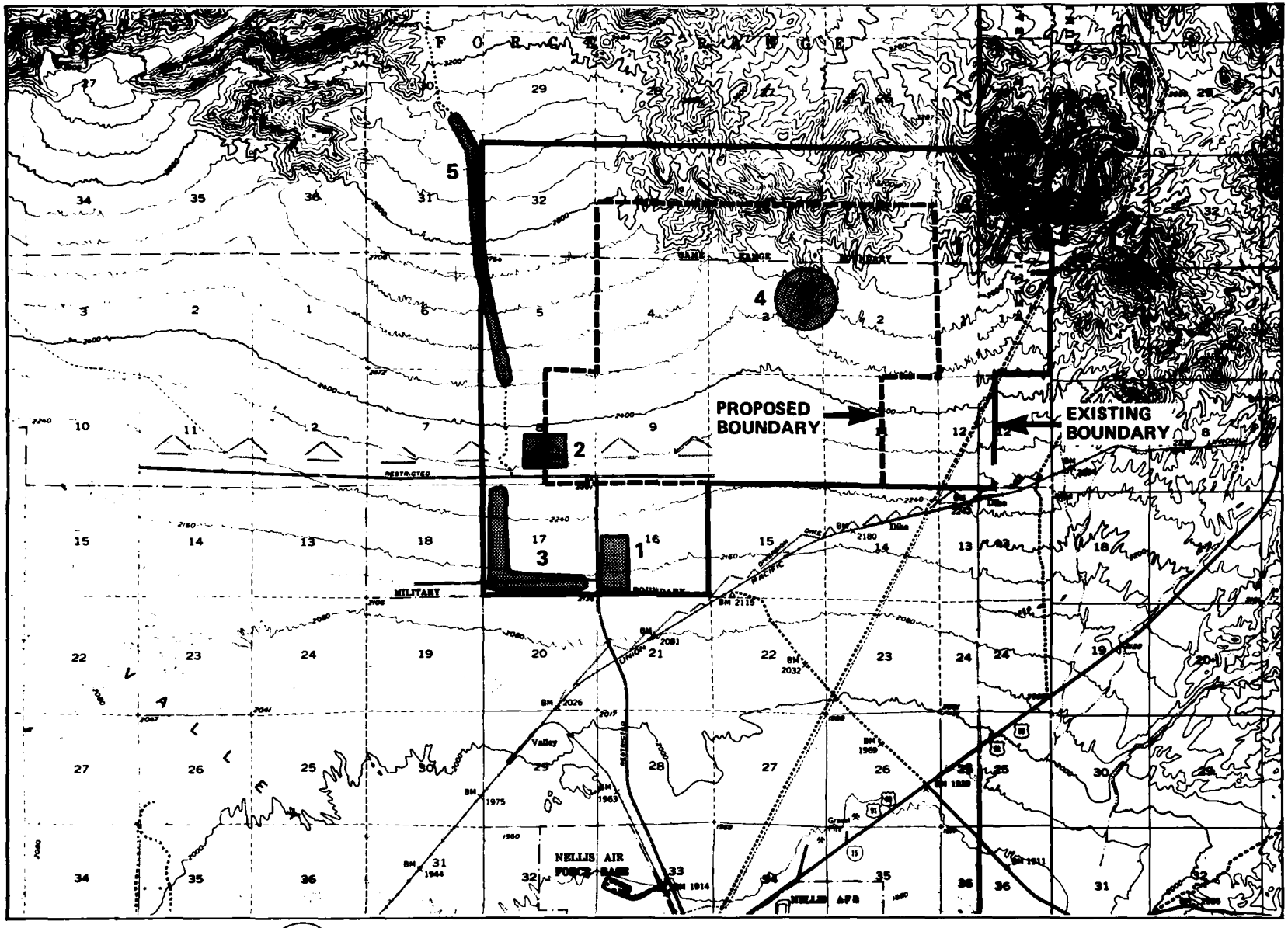

FIGURE 15
NELLIS AFB
SMALL ARMS RANGE
WASTE DISPOSAL SITES

but the potentially hazardous characteristics of the wastes and the possibility of migration due to the disposal of liquids cause the need for rating of this site.

Site No. 3 - Ordnance inactivation and disposal area located in the southwest corner of the existing range property. Portions of this area have been used for small arms residue burning. Miscellaneous skeet range target debris is scattered throughout the area, and munitions residue disposal was reported. If improperly inactivated, the wastes could be hazardous, but contaminant migration is not anticipated because of their physical character and the relative lack of transport mechanisms. Rating is not required for this site.

Site No. 4 - Ordnance ejection area on Jettison Hill. This area was used for the emergency ejection of live and practice bombs and rockets from aircraft. This ordnance was and still is periodically collected and detonated. Improperly inactivated wastes remaining on Jettison Hill could be hazardous, but contaminant migration is not anticipated because of their physical character and the lack of transport mechanisms.

Site No. 5 - Radioactive waste disposal pits near the gravel road leading north from the range. Part of the site is on BLM land. An individual report was made of 10 to 20 auger holes dug for the disposal of radioactive wastes in this area around 1960. The report could not be confirmed, and no evidence of such disposal was found. The physical nature of the reported waste is unknown.

The radioactivity of the wastes is anticipated to be low-level but should still be considered hazardous. Rating of this site is required.

D. CONCLUSIONS

1. No direct evidence was found to indicate that migration of hazardous contaminants beyond the Nellis AFB Small Arms Range property boundaries exists.

2. Information obtained through the interviews with past and present base personnel and through field observation indicates that small quantities of hazardous wastes have been disposed of on the small arms range.

3. Low precipitation, high evaporation, the absence of major surface waters, moderately deep groundwater levels, and the remoteness of the area limit the possible pathways for hazardous contaminant migration. The soils are similar to those underlying Nellis AFB, and their permeability is low. The potential for significant hazardous contaminant migration at all the sites is low.

4. Property proposed to be excessed includes part of one landfill (Site No. 2), all of another landfill (Site No. 1), and the possible radioactive waste disposal area (Site No. 5). Potentially hazardous industrial wastes have been disposed of in both of the landfills. Migration of hazardous contaminants beyond the immediate vicinity of the landfills is not likely.

E. RECOMMENDATIONS

1. Groundwater monitoring for hazardous contaminant migration is not considered necessary at the small arms range. The potential for large-scale contamination or contaminant migration at all of the sites is negligible.

2. The following item was recommended to the base environmental program:

   a. Surface radioactivity level measurements are suggested along the road leading north from the range (Site No. 5) to confirm if such wastes may have been disposed of in the area.

VIII. INDIAN SPRINGS AIR FORCE AUXILIARY FIELD

A. DESCRIPTION

Indian Springs AFAF is located approximately 40 miles northwest of Nellis AFB (refer to Figure 1). The Field was established in 1942 to serve as a support area for range activities. Except for the period from 1947 until 1950 when the Field was inactivated, the mission at Indian Springs has remained essentially the same.

Presently, the major activities at Indian Springs AFAF include maintenance of six helicopters used in support of Department of Energy programs, vehicle maintenance, and facilities upkeep. Past activities have included higher levels of aircraft maintenance, washdown of aircraft that passed through radioactive dust clouds, and higher levels of vehicle and facility maintenance associated with the operation of a larger facility. Activity levels were particularly higher from 1954 until 1958.

B. ENVIRONMENTAL SETTING

1. Meteorology

Indian Springs AFAF is located in an arid portion of the Great Basin. Mean annual precipitation is 3.4 inches. Average annual lake evaporation near Indian Springs is 68 inches. Mean daily minimum and maximum temperatures range from 23 degrees F and 55 degrees F in January to 63 degrees F and 104 degrees F in July.

Table VIII-1 presents a summary of the meteorological conditions at Indian Springs AFAF.

2. Geology and Hydrology

The Field is situated on valley fill material, and several bedrock outcrops occur in the nearby hills and mountains. The general geology of the area is typical of the basin and range physiographic province (refer to Section III). The intermountain valleys are filled with a heterogeneous assemblage of gravel, sand, silt, and clay. The surrounding mountains are composed of consolidated Paleozoic rocks, many of which are carbonates. The depth to bedrock beneath the Field is variable but was encountered at 276 feet in a base well.

No natural perennial streams occur at the Field. Ephemeral surface runoff typically happens as a result of localized thunderstorms that occur during the summer months. Short-lived flash flooding can occur during these storms. Surface runoff from the base flows northward toward the playa in the closed basin of Indian Springs Valley.

Under normal conditions, STP effluent from the Field flows northwest in a surface channel. The effluent typically evaporates and percolates into the soil, and no surface runoff reaches the playa. Following intense rainfall, substantial flow can occur in the channel, allowing surface runoff to reach the playa.

Table VIII-1
METEOROLOGICAL SUMMARY, INDIAN SPRINGS AFAF, 1959-1981

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years of Record
Temperature (°F)														
Mean Daily Max.	55	61	69	79	88	98	104	102	95	82	66	58	80	20
Mean Daily Min.	23	27	32	42	49	57	63	61	53	41	29	24	42	19
Extreme Monthly Max.	78	82	90	97	108	118	116	114	117	100	86	79	118	20
Extreme Monthly Min.	-3	3	13	21	26	38	49	42	31	21	8	3	-3	19
Precipitation (in.)														
Monthly Mean	0.4	0.33	0.25	0.3	0.13	0.1	0.46	0.29	0.26	0.25	0.37	0.3	3.4	22
Snowfall (in.)														
Monthly Mean	1.8	0.2	0	0.1	0	0	0	0	0	0	0.1	0.2	2.4	20
Relative Humidity (%)														
Mean	52	50	41	22	--	--	--	9	16	28	49	45	--	2
Mean Days of Occurrence														
Precipitation $\geq$ 0.1 in.	1.4	1.3	0.6	0.8	0.2	0.5	1.3	0.9	1.3	1.3	1.4	1.2	12.2	22
Max. Temperature $\geq$ 90°F	0	0	1	4	15	27	31	30	25	9	0	0	141	10
Min. Temperature $\leq$ 32°F	28	21	16	2	0	0	0	0	0	3	20	28	118	8
Min. Temperature $\leq$ 0°F	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Wind Speed > 17 knots	0.4	5.1	4.4	8.0	--	--	--	0	0.9	0.3	2.9	0	--	2
Wind Speed $\geq$ 28 knots	0	0	0.8	1.5	--	--	--	0	0	0	0.2	0	--	2

Source: Nellis AFB Weather Officer.

Groundwater occurs both in the valley fill sediments and in the underlying consolidated Paleozoic carbonate bedrock. Hydrogeologic studies have disclosed that the carbonate bedrock in the Indian Springs area is part of a regional groundwater flow system (Winograd et al., 1975). The regional movement of water is north from the Field and then westward, eventually reaching the groundwater discharge area in Ash Meadows (approximately 45 miles to the west).

The valley fill material at Indian Springs is a mixture of gravel, sand, and clay. The depth to water beneath the Field is about 50 feet. Only a few wells exist in the area, and little is known about the actual direction of groundwater movement in the valley fill material. The groundwater may move in a generally northward direction. Some groundwater from the valley fill probably enters the deeper carbonate aquifer.

The quality of water in the Indian Springs area is generally good although hard. No evidence of groundwater contamination was found during this study.

3. Environmentally Sensitive Conditions

Indian Springs AFAF is on the southern border of an enclosed drainage basin. The predominant plant community in this basin is saltbush, which reflects the increased salt content of the soil. Dominant species include shadscale, four-winged saltbush, and green molly.

No sensitive habitat or designated rare, threatened, or endangered species are known to exist in the proximity of Indian Springs AFAF.

C. FINDINGS

1. Industrial Operations

A list of major shops or other waste generators currently active at Indian Springs AFAF is presented in Table IV-1. The list includes many types and quantities of chemicals used.

Comparison of the present facilities with a similar listing from 1961 (refer to Table VIII-2) reflects the higher activity levels of the past. Data on waste oil and solvent quantities from past operations were not available. Currently, 400 gallons of waste oil are transported to Nellis AFB every 6 months. Based on the increased activity levels, past waste oil generation was probably much higher. This quantity does not include approximately 5 gallons per month of waste oil from helicopter maintenance reported to be disposed of on the range. Also, small quantities of oil may be discharged to the sanitary sewer system via floor drain connections to the sewer.

No major ordnance inactivation or disposal activities have been conducted at Indian Springs AFAF. Entomology services (particularly herbicide application along the runways) are provided by Nellis AFB on a monthly basis. Building and shop wastes are not collected by the storm drain. Small quantities

Table VIII-2
INDIAN SPRINGS AFAF FACILITIES COMPARISON
BETWEEN 1961 and 1981

Facility	Description
1961	
79	Maintenance Hangar
80	Radar
82[a]	Aircraft Maintenance
146[a]	Refueling Vehicle Maintenance
224	Auto Service Rack
227[a]	Auto Maintenance Shop
231	CE Maintenance Shops
234	CE Maintenance Shops
240	Auto Wash Rack
260	Dispensary
261	Auto Maintenance Shop
283	Auto Service Rack
284	Auto Service Rack
1981	
79	Maintenance Hangar
140	Auto Hobby Shop
225	Vehicle Maintenance
231	CE Maintenance Shops
232	Power Production
234	Sheet Metal/Welding
260	Clinic
265	Field Shops

[a]Building no longer exists.

of miscellaneous oils could be contained in the flight line runoff. Active and abandoned POL storage tanks and oil/water separators at Indian Springs AFAF are listed in the appropriate tables of Appendixes E, F, and G.

2. Disposal Sites

Seven waste disposal sites were identified at Indian Springs AFAF. A short description of each site and the rationale for determining whether subsequent rating is necessary follow. The sites are shown in Figure 16. Rating scores are presented in Table V-1. Transport mechanisms at Indian Springs AFAF are limited, especially when liquid waste disposal is not involved. Precipitation is low, evaporation is high, and the groundwater table is moderately deep.

Site No. 1 - Landfill located near the eastern boundary. This area may have been used for the disposal of all Field wastes prior to 1975. The exact start date is unknown; but based on the Field history, sometime in the early 1950's is likely. Wastes from the Field have been hauled off base since 1975. This landfill was reopened in 1981 for the disposal of demolition debris, but visual inspection revealed that miscellaneous refuse has also been disposed of recently. The landfill has been used extensively and may contain moderate quantities of miscellaneous industrial wastes. Six above-ground concrete waste oil tanks (approximately 1,000 gallons each) are located in the fill area. No evidence of leakage was observed. The potentially hazardous characteristics of the

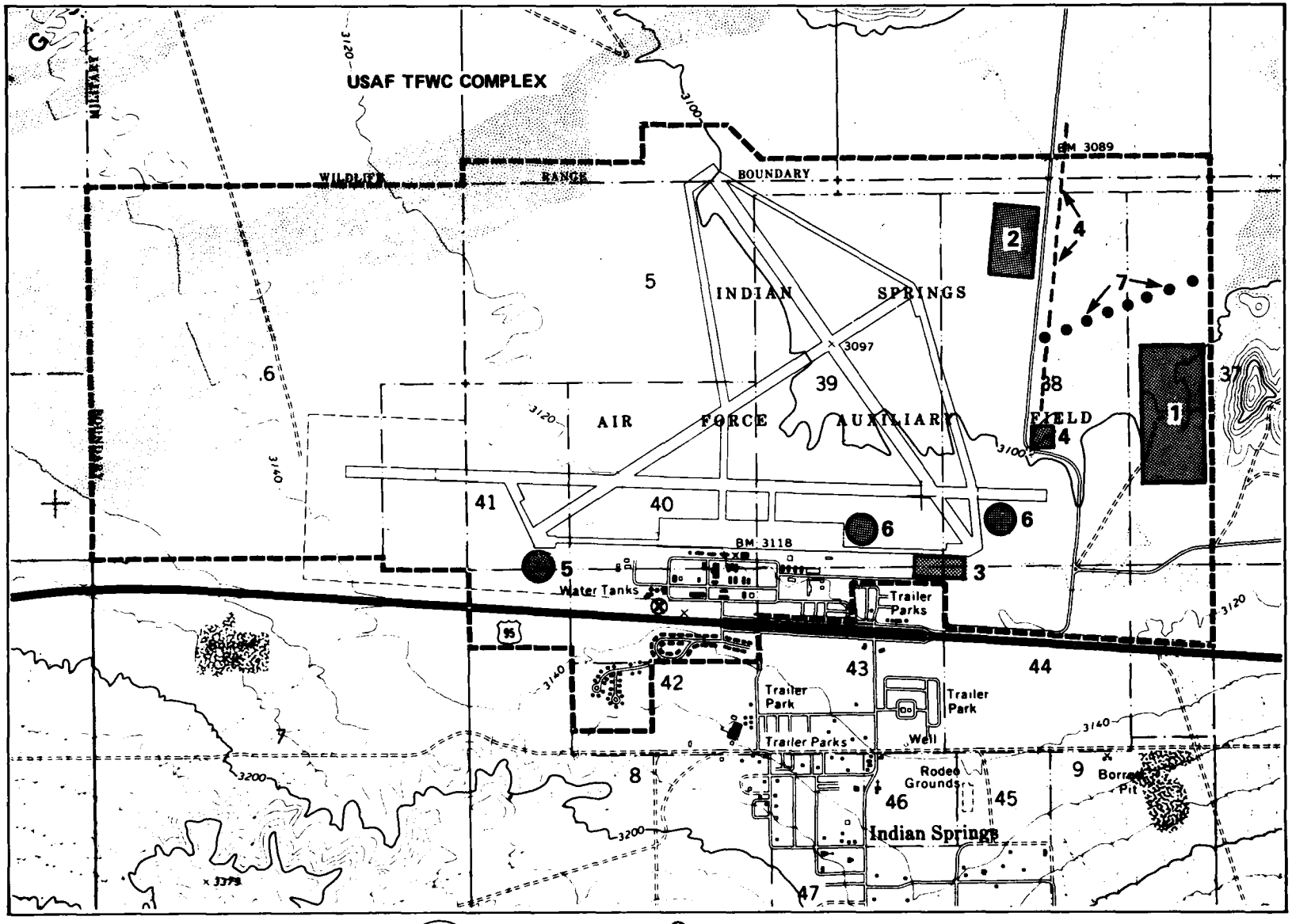

FIGURE 16
INDIAN SPRINGS AFAF
WASTE DISPOSAL SITES

wastes and the threat of contaminant migration due to the possible disposal of liquids cause the need for rating of this site.

Site No. 2 - Landfill located in the northeast quadrant west of the STP outfall ditch. Vehicle parts, targets, and miscellaneous debris were reportedly disposed of at this site, but the dates could not be determined. No chemical disposal was reported. The characteristics of these wastes are not considered hazardous, and rating is not required.

Site No. 3 - Burial pits located in the southeast portion of the Field. The types of wastes buried at this site and the dates of operation could not be verified. The site may have been used for general waste disposal during the 1940's and early 1950's. The quantity of industrial wastes generated during that period would have been very small, and rating of this site is not considered necessary because of the low probability of hazardous contamination.

Site No. 4 - Sewage treatment area located north of the east end of runway 26. A pit for disposal of material collected on the bar screen is located adjacent to the fenced-in Imhoff tank treatment system. Effluent discharges to the north through an evaporation/percolation ditch. Sludge drying beds are provided within the fenced-in area. The Imhoff tank treatment system has been in operation since the mid-1950's.

Floor drains from essentially all of the facilities at Indian Springs have always been connected to

the sanitary sewer, but significant quantities of wastage were not reported. Based on the type of activities conducted at Indian Springs AFAF, e.g., routine vehicle and aircraft maintenance, the quantity of potentially hazardous wastes discharged to the sanitary sewer is suspected to be very small with negligible effect. No threat of hazardous contamination is anticipated, and rating of this site is not required.

Site No. 5 - Fire training area located to the west of the Field buildings. Fire training has been conducted in this area since 1959. Reportedly, another unidentifiable area was used from 1954 until 1959. Since 1976, only clean JP-4 fuel has been burned in the area. Several contaminated fuel drums were observed in the area, but these are transported to Nellis AFB and not burned. The use of potentially hazardous waste oils and solvents for fire training in the past causes a threat of hazardous contamination and migration. Rating is required for this site.

Site No. 6 - Aircraft washdown areas located south of runway 26 near the east end. These areas may have been used for washing aircraft exposed to radioactive dust clouds in the early 1950's. No evidence of such use or any adverse effect was available or observable. The characteristics of the wastes may have been hazardous, but no contamination or migration was identifiable. The radioactive constituents of the washwater would have decayed rapidly, and rating is not required for this site.

Site No. 7 - Oil spreading site located in the northeast quadrant on the road northeast of the STP. Approximately 400 gallons of waste POL were spread along this road as a dust palliative in the late 1970's. This quantity is considered inconsequential because of the high evaporation and low precipitation in the area. No threat of hazardous contamination or migration exists, and rating is not required.

D. CONCLUSIONS

1. No direct evidence was found to indicate that migration of hazardous contaminants beyond the Indian Springs AFAF boundaries exists.

2. Information obtained through interviews with past and present Nellis AFB and Indian Springs AFAF personnel and through field observation indicates that small quantities of hazardous wastes have been disposed of on Air Force property at Indian Springs AFAF.

3. Industrial activity at Indian Springs AFAF consists primarily of routine vehicle and aircraft maintenance. Activity levels are much lower now than in the past, but the quantities of hazardous wastes generated have always been much less than at Nellis AFB. The potential for a contamination problem is low.

4. Low precipitation, high evaporation, the absence of major surface waters, and moderately deep groundwater levels limit the possible pathways for hazardous contaminant migration. Groundwater movement is to the north into the USAF TFWC Complex. The potential for

significant hazardous contaminant migration beyond the boundaries of Indian Springs AFAF is low, and the potential for contaminant migration off Air Force property is negligible.

E. RECOMMENDATIONS

1. Hazardous contaminant migration is not indicated at Indian Springs AFAF, and no Phase II monitoring is recommended.

IX. OTHER OFF-BASE FACILITIES

Five other off-base facilities were examined during the records search. These facilities included:

1. Water Systems Annex (visited)
2. Apex Obstruction Light Annex (not visited)
3. Beatty Recreation Annex (not visited)
4. Nellis AFB Communications Annex (not visited)
5. Mt. Sunrise Obstruction Light Annex (not visited)

The Water Systems Annex is located on Craig Road, approximately 5 miles west of Nellis AFB. The site includes three water supply wells. Empty, abandoned, underground fuel storage tanks are located adjacent to two of the wells. No evidence was discovered of any waste disposal activities or major fuel spills on the annex property.

The Apex Obstruction Light Annex is located approximately 8 miles northeast of Nellis AFB. No records or interviews indicated that waste disposal activities or major oil spills occurred at this site.

The Beatty Recreation Annex is a building rented from a trailer court operation in Beatty, Nevada, 120 miles northwest of Nellis AFB. Hazardous waste generation does not occur at this site.

The Nellis AFB Communications Annex is a radar facility located approximately 30 miles west of Nellis AFB on Angel Peak. The facility is now operated by the Federal Aviation Administration (FAA). Vehicle maintenance and electronic equipment repair have been conducted at the site in the past,

but the quantities of potentially hazardous wastes generated would have been insignificant. No waste disposal areas were identified at the communications annex.

The Mt. Sunrise Obstruction Light Annex is located approximately 3 miles east of Nellis AFB. No records or interviews indicated that waste disposal activities or major oil spills occurred at this site.

An ingrant-outgrant listing was reviewed to identify any other sites that may have been used for the disposal of potentially hazardous wastes. No sites were found within the properties covered by the records search. Waste disposal sites or potentially hazardous spill areas were not found at any of the other off-base facilities. No further action is required.

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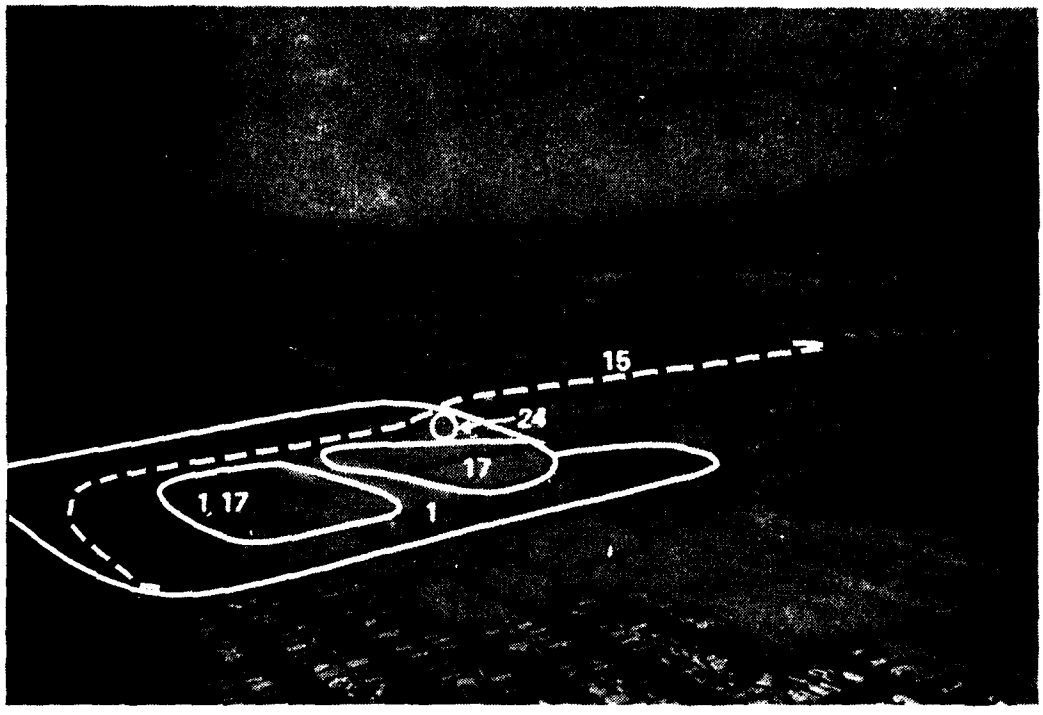
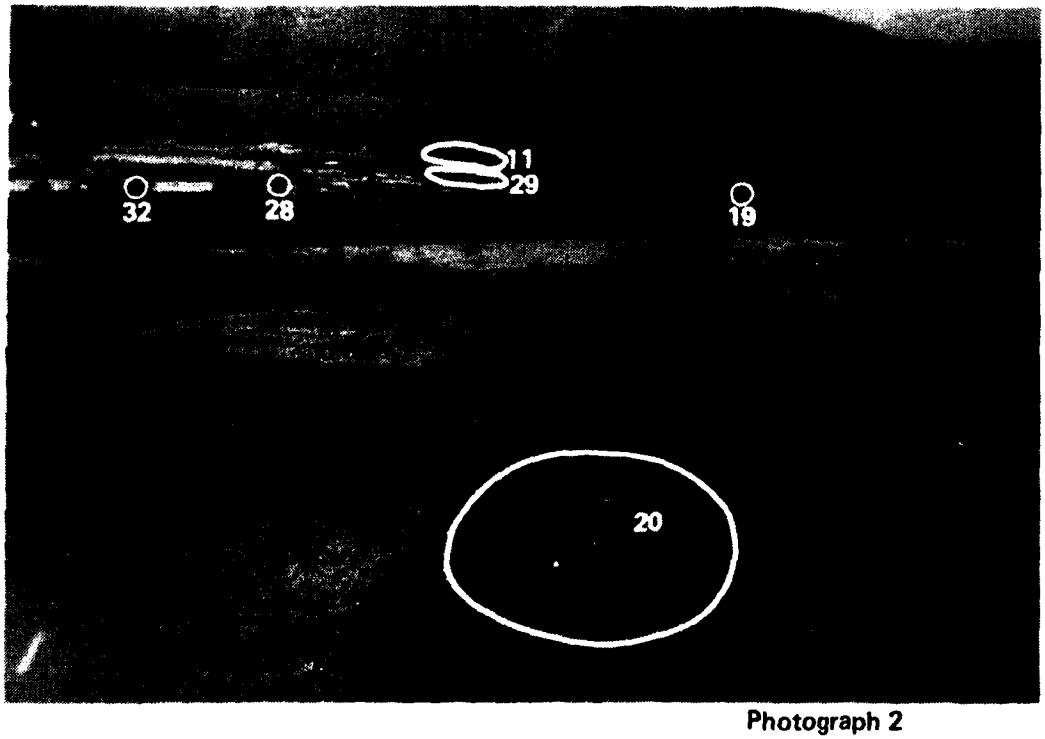
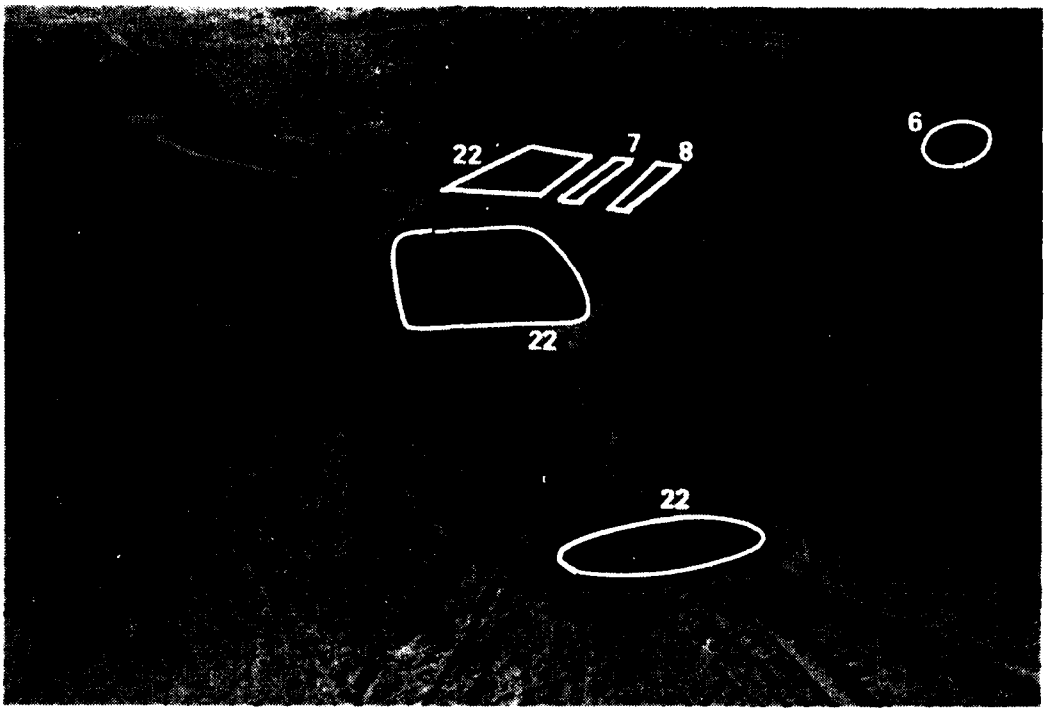


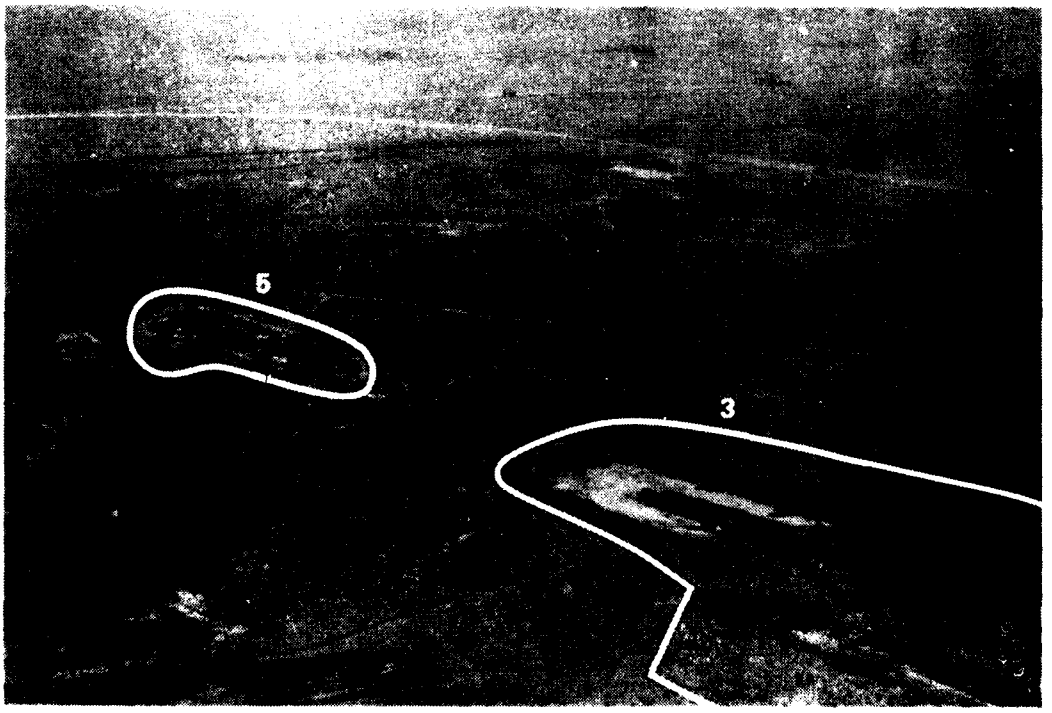
Photograph 1
SOUTH DISPOSAL SITES
NELLIS AFB



Photograph 2
EAST DISPOSAL SITES
NELLIS AFB

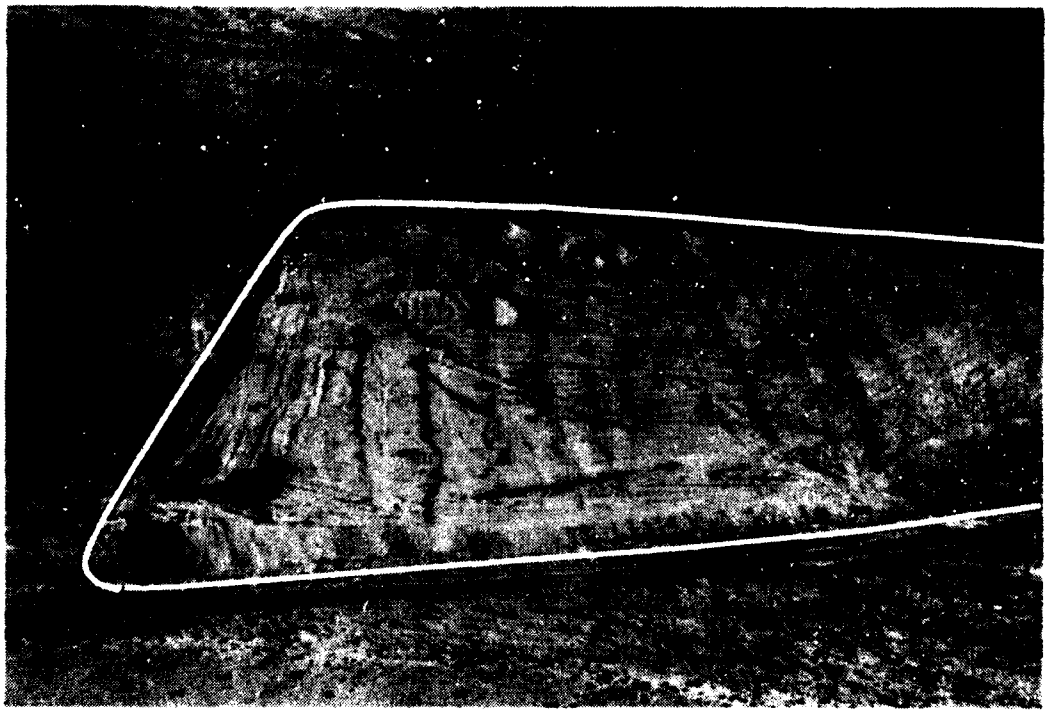


Photograph 3
DISPOSAL SITES AND STP
NELLIS AFB (Area II)

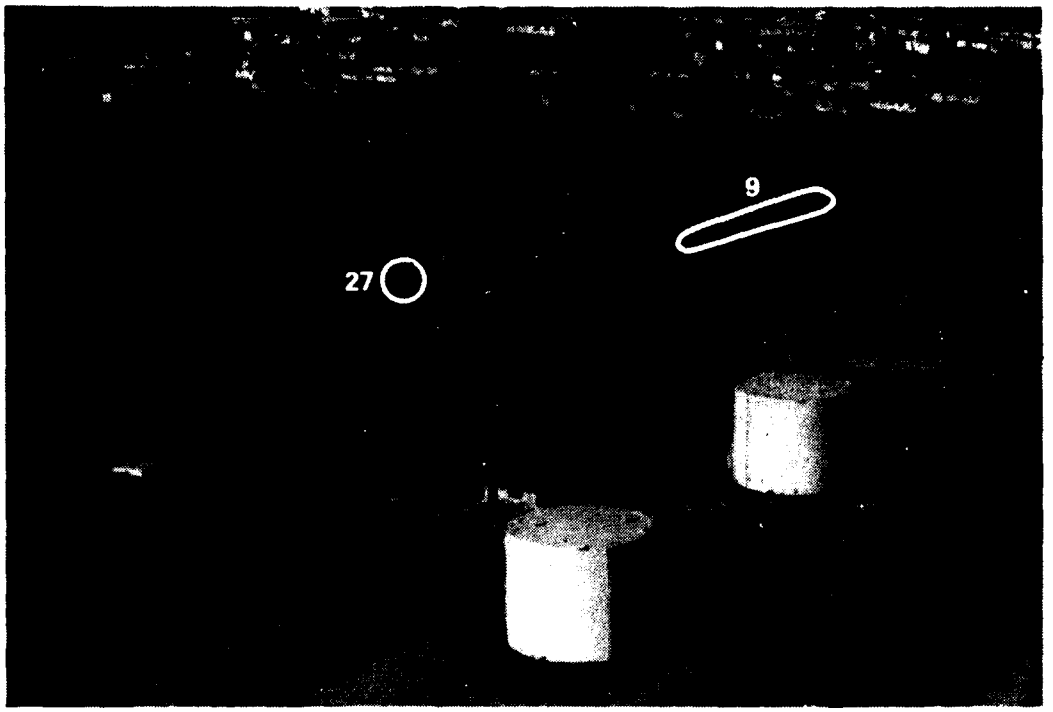


Photograph 4
LANDFILL SITES
NELLIS AFB (Area II)

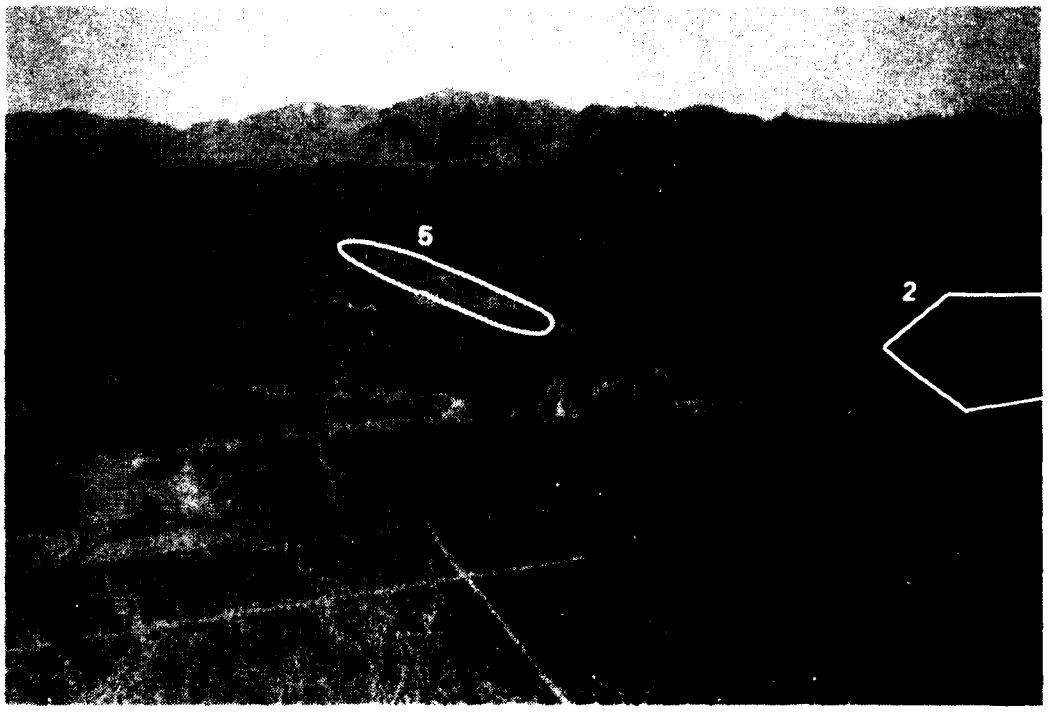
Photograph 5
DRY AND WET RADIOACTIVE WASTE DISPOSAL SITES NELLIS AFB (Area II)



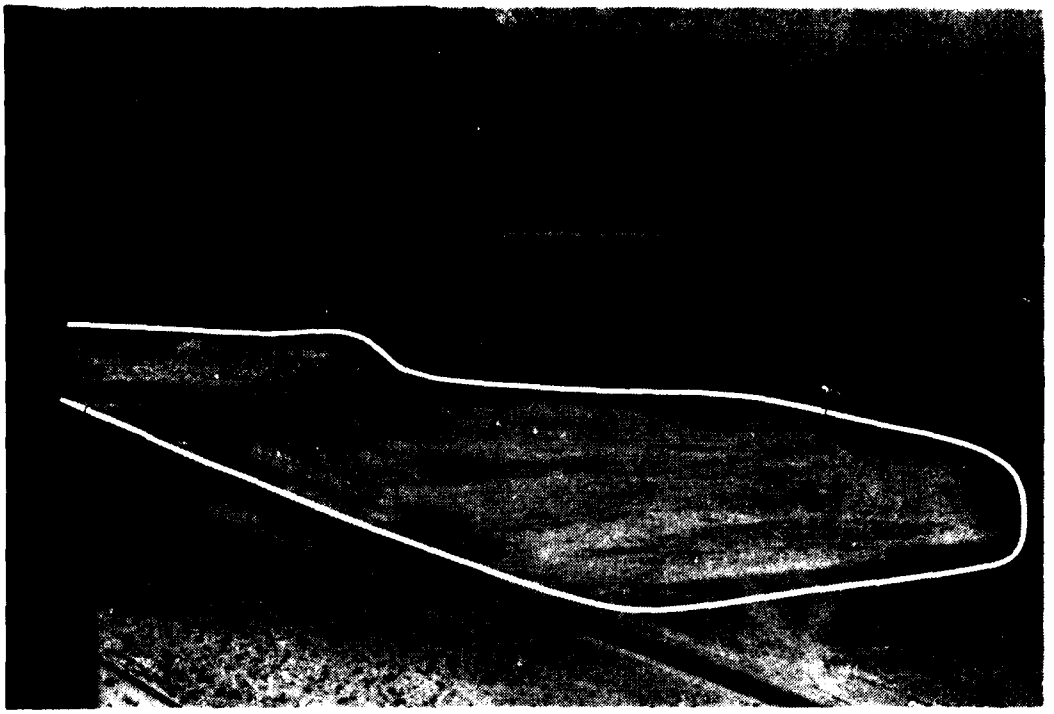
Photograph 6
BASE LANDFILL NO. 2 NELLIS AFB (Area III)



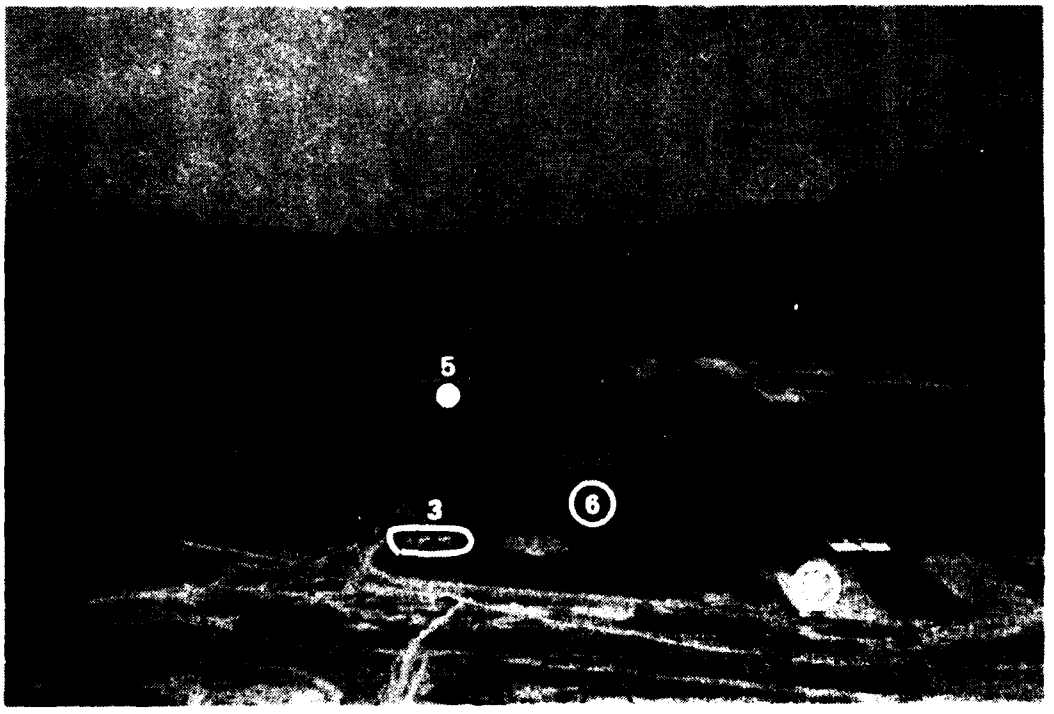
Photograph 7
WASTE POL STORAGE AREA
NELLIS AFB (Area III)



Photograph 8
DISPOSAL SITES
NELLIS AFB SMALL ARMS RANGE



Photograph 9
BASE LANDFILL NO. 1
NELLIS AFB SMALL ARMS RANGE



Photograph 10
DISPOSAL SITES
INDIAN SPRINGS AFAF

Photograph 11
LANDFILL NO. 1
INDIAN SPRINGS AFAF

Appendix A
RESUMES OF TEAM MEMBERS

■ MICHAEL C. KEMP

Education

M.S., Civil and Environmental Engineering, Utah State University, 1978
B.S., Civil Engineering (environmental emphasis), Tennessee Technological University, 1976

Experience

Since joining CH2M HILL in June of 1978, Mr. Kemp has participated in a variety of projects. His major project experience includes:

- On-site inspection, operations and maintenance manual preparation, and construction services for the expansion of a potato processing wastewater treatment plant in Quincy, Washington.
- Preparation of operating and closure plans for RCRA hazardous waste disposal requirements for Gulf Oil Company, Port Arthur, Texas.
- Preliminary study of sanitary landfill leachate treatment alternatives for Portland Metro.
- *Feasibility of land application of pulp mill wastewaters* for Australia Pulp Manufacturers, Melbourne
- Review of sampling, analysis, and treatability alternatives used in the EPA Aluminum Forming Development Document for the Aluminum Manufacturers Association.
- Miscellaneous coal fines dewatering facility design and hydraulic analyses for the Washington Irrigation and Development Company.
- Miscellaneous facility design and preparation of the operations and maintenance manual for the ITT Rayonier pulp mill wastewater treatment plant in Port Angeles, Washington.

Before joining CH2M HILL Mr. Kemp served 2 years as a laboratory research assistant at the Utah Water Research Laboratory where he conducted a wide variety of chemical and biological water quality analyses and operated a pilot scale overland flow tertiary treatment system. Mr. Kemp's other experience includes 6 months as a surveyor with the National Park Service and 1 year as an engineering assistant in a construction administration office of the Atomic Energy Commission.

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Technical Certification

Engineer-In-Training, Tennessee
Class II Wastewater Treatment Plant Operator, Washington

MICHAEL C. KEMP

Membership in Organizations

American Society of Civil Engineers
Chi Epsilon
Pacific Northwest Water Pollution Control Association
Water Pollution Control Federation

Publications

Kemp, M.C., D.S. Filip, and D.B. George, 1978. Evaluation and Comparison of Overland Flow and Slow Rate Systems to Upgrade Secondary Wastewater Lagoon Effluent, Utah Water Research Laboratory, Logan, 70 pages.

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■ STEVEN R. HOFFMAN

Education

B.S., Civil Engineering, South Dakota School of Mines and Technology, 1971

Experience

Mr. Hoffman is a civil and sanitary engineer who is currently serving as a project manager and project technical consultant on a variety of solid and hazardous waste management projects for CH2M HILL. Examples of his project experience are:

- Project technical consultant on various aspects of municipal, industrial, and hazardous solid waste collection and disposal. Projects include collection system analysis; waste characterization and reduction; municipal solid waste landfill site selection, design, and gas recovery; and landfill disposal of hazardous and industrial sludges throughout the U.S.A.
- Project manager for a hazardous waste disposal study for an ARCO oil refinery in Washington, including waste extraction analysis, groundwater and unsaturate zone monitoring, and waste migration analysis.
- Project manager for assistance with compliance to RCRA regulations for a Gulf Oil refinery in Texas, including waste characterization, preparation of interim status plans, implementation of monitoring programs, and assistance in permit preparation.
- Assistant project manager for hazardous materials disposal site record searches for two U.S. Air Force bases to assess potential for waste migration from present and past practices and to recommend followup actions.
- Assistant project manager responsible for sanitary landfill design and preparation of operations plan and contract bid documents for a municipal solid waste landfill in Portland, Oregon.
- Project manager in developing a disposal system for and analyzing the impacts of a new land disposal technique for an industrial/hazardous sludge containing a high concentration of heavy metals, for the Monsanto Corporation, Seattle, Washington.
- Project manager for ITT Rayonier pulp and paper mill sludge disposal landfills in Grays Harbor and Clallam Counties, Washington, including site feasibility studies, final designs, and operational plans.

STEVEN R. HOFFMAN

- Assistant project manager for a resource recovery feasibility study and solid waste management plan for Snohomish County, Washington. The project includes alternative technology analysis, economic feasibility analysis, marketing studies, and management strategies.

- Project engineer for the Solid Waste Management Study for King County, Washington. Mr. Hoffman's responsibilities included assessing the environmental impacts of solid waste handling facilities and performing conceptual designs and costing for transfer stations, shredding and baling facilities, ocean disposal, resource recovery process systems, rail haul facilities, energy recovery systems, and sanitary landfills.

- Project manager for developing a solid waste management plan for Trinity County, California, with major emphasis on transfer, transport, sanitary landfill, and management options.

- Project manager and project engineer on a variety of water resources projects including flood studies, urban drainage and water quality studies, and environmental impact studies.

- Project engineer for developing a preliminary design for a solid waste transfer and refuse-derived fuel processing facility for the Metropolitan Service District, Portland, Oregon.

- Project engineer for preliminary and final design of a shredfill processing facility for Cowlitz County, Washington, which consisted of shredding, magnetic separation, leachate collection, treatment, and disposal.

- Project engineer for a pyrolysis and energy recovery feasibility study and a phased sanitary landfill design for Grays Harbor County, Washington. The design included a rural collection/transfer system to transport wastes to the landfill site.

Prior to joining CH2M HILL, Mr. Hoffman was a pollution control engineer with the Environmental Protection Agency where he conducted site investigations and wrote pollution control standards for South Dakota.

Professional Registration

Washington

Membership in Organizations

American Society of Civil Engineers

FRITZ R. CARLSON
Department Manager, Ground Water

Education

M.S., Hydrology, University of Arizona, 1974
Graduate Courses in Geology, University of California, Berkeley, 1966-68
B.A., Geology, University of California, Berkeley, 1966

Experience

Mr. Carlson is manager of the Ground Water Department for our Redding region with 9 years' experience in hydrogeology and groundwater hydrology. His capabilities include the following:

- Development of ground-water resources, including well and well field design, hydrogeologic mapping, aquifer testing, and well site selection
- Control of ground water, including design and analysis of subsurface drains and design of dewatering facilities
- Protection of ground-water resources, ranging from investigation of basinwide salt balance problems to site-specific investigations of ground-water pollution from landfills, tailings impoundments, radioactive liquids, and domestic wastewater
- Basin studies, including estimation of the recharge and discharge budget of ground-water basins—Such investigations include analysis of potential recharge and discharge under varying land use and pumping conditions.
- Modeling of ground-water flow and quality, ranging from simple analytical models of homogeneous flow fields to complex numerical models of the flow and quality of ground water in major ground-water basins

Mr. Carlson's experience as a hydrogeologist includes the following projects:

- Water well and well field design for several areas throughout the U.S.
- Basinwide ground-water studies of the Round Valley and Livermore Valley, California, and Truckee Meadows, Nevada
- Analysis and mitigation of seasonally high ground-water levels in the Redding basin
- Analysis of pumping test permeability data for proposed damsites near Cottonwood, California

FRITZ R. CARLSON

- Preparation of a ground-water quality computer model of the Livermore Valley, California
- Analysis of the probable cause of decline in yield of key industrial wells in Pilot Rock, Oregon—The study included analysis of present and future ground-water rights, regional declines in ground-water levels, and caving and incrustation of the existing well.
- Analysis of the ground-water regime in and near a proposed open-pit barite mine and tailings impoundment in Arkansas
- Hydrogeologic investigation of several alternative sites for a new sanitary landfill for Shasta County, California—The investigation included test drilling, permeability testing, and analysis of the rate and direction of leachate movement.
- Supervising hydrogeologist for a project to develop a large ground-water supply for a refinery and city in a remote area of Indonesia—This project included geologic mapping and rock source exploration, well design, well site selection, well field design, drilling supervision, aquifer testing, and water-quality testing.
- Study and prediction of the movement of radionuclides from hypothetical spills at numerous nuclear power plants
- Seepage estimates from various types of ponds at coal-fired plants, nuclear plants, and mines

Mr. Carlson has also been employed by Bechtel, Inc., as a hydrogeologist based in San Francisco, and by Lawrence and Associates in Redding, where he was vice-president and hydrogeologist. He also worked as a hydrogeologist while stationed in India with the U.S. Peace Corps.

Professional Registration

California — Registered Geologist No. 3397

Membership in Organizations

National Water Well Association

■ **JANE DYKZEUL GENDRON**
Biologist

Education

B.A., Biology (emphasis on Marine Biology) San Francisco State University 1976

Experience

Ms. Gendron is a general biologist in the environmental sciences department of CH2M HILL. Her experience consists of studies in freshwater and marine biology and ecology, water quality sampling and analysis, and terrestrial ecology. She has participated in the assessment of the ecological impacts of many industrial and municipal developments.

Ms. Gendron's experience includes the following:

- Washington State Department of Ecology. Field data collection, laboratory water quality analysis, sanitary surveying, and report preparation for the bacteriological study of Willapa Bay.
- U.S. Air Force, West Coast bases. Assessed the potential for migration of hazardous material through natural systems at several west coast Air Force bases during Phase 1 of the Air Force Installation Restoration Program.
- Pacific Gas Transmission, San Francisco, California. Aquatic biology task leader in the selection of a natural gas pipeline corridor route in Wyoming, Utah, Nevada, and California.
- Metropolitan Service District, Portland, Oregon. Prepared preliminary site descriptions and identified sensitive species and systems occurring at or near several proposed sanitary landfill sites.
- Ventura Regional County Sanitation District, Oxnard, California. Field data collection, laboratory analysis, and report preparation for application for waiver of secondary sewage treatment requirements.

Before joining CH2M HILL, Ms. Gendron worked for the University of Southern California's Catalina Marine Science Center, where she designed and directed a reconnaissance survey of the terrestrial and marine ecosystems along 26 miles of coastland and was involved in an ecological assessment of impacts of the City of Avalon's marine sewage outfall.

Membership in Professional Organizations

American Fisheries Society
American Institute of Biological Sciences
Western Society of Naturalists

Publications (Authored as Jane E. Dykzeul)

"Reconnaissance Survey—Santa Catalina Island; Area of Special Biological Significance—Subarea 1." State of California Department of Fish and Game. Report to California State Water Quality Control Board. May 1978. 130 pp.

Appendix B
OUTSIDE AGENCY CONTACT LIST

U.S. GOVERNMENT

1.	EPA, Las Vegas Labs, University of Nevada		Joseph Blume
	U.S. Fish & Wildlife Service	206/753-9440	Gale Kobetich Ed Laurenson Jim Bottoroff
2.	Bureau of Management	702/385-6403	Rob Nauert
3.	Soil Conservation Service	702/385-6426	John Collie
4.	Forest Service	702/385-6255	David Young
5.	USGS Las Vegas Office	702/293-8507	Jack Sarkin
6.	USGS Carson City Office	702/882-1388	Mike Dettinger
7.	U.S. Bureau of Mines	702/293-8507	Carl Dewey
8.	U.S. Bureau of Reclamation	702/293-2161	Ron Effertz
		702/293-8434	Bob McCullough

STATE OF NEVADA

9.	Department of Nevada Resources (State Engineer)	702/732-2562	Marie McCaucuy
10.	Desert Research Institute	702/739-3411	--
11.	Department of Conservation and Environmental Protection Service	702/885-4670	Vern Ross Lou Dodgion Marvin Toubeau
12.	Department of Agriculture	702/386-5256	Mr. Zoller
13.	Wildlife Department	702/784-6214	Willie Mollini
		702-385-0285	Bob McQuincy
14.	Department of Human Resources, Health Division	702/385-0285	Larry Franks
15.	Department of Natural Resources, Forestry Division	702/385-0123	--
16.	Department of Nevada Resources (State Engineer)	702/732-2562	Marie McCaucuy
17.	Desert Research Institute	702/739-3411	--

CLARK COUNTY

18.	Sanitation District	702/458-1180	James Wren-Jarvis Ron Billie Bucky Faulkner
19.	Comprehensive Planning Department	702/386-3181	Dick Bohertz
20.	Public Works Department, Flood Control and Development	702/386-4624	Laurnal Gukler
21.	Special Improvement District	702/386-4618	Carla Pierson
22.	Solid Waste Management	702/386-4631	Mr. Kenecht

23. Health Department	702/383-1263	Felix Habis
24. Water District	702/870-2011	Bob Recil
25. Planning	702/386-4181	Dennis Bechtel

CITY OF LAS VEGAS

26. Environmental Quality Office	702/386-6276	Jim Scofield
27. Department of Public Services	702/386-6272	--
28. Waste Water Treatment Plant	702/457-1233	--

OTHER

29. Clark Disposal	702/735-5151	Thomas Isola
30. Nevada Environmental Landfill	702/293-2276	Steve Porter

Appendix C
INSTALLATION HISTORY

BASE HISTORY

The site of what is now Nellis AFB has been used for flight operations since 1929. From 1929 until 1940, the field consisted of dirt runways, a few buildings, and related utilities. In 1940, the City of Las Vegas purchased and improved the field for use in training civilian pilots. Later that year, the field was offered to the Army Air Corps for use as a flexible gunnery school. Air-to-air gunnery training was started in 1942 for five school squadrons. A camp was established during late 1941 and early 1942 at Indian Springs, Nevada, to serve as a support area for activities at the Las Vegas bombing and gunnery ranges.

The Army Air Force flexible gunnery school first concentrated its efforts on training B-17 gunners. Training included theoretical instruction, shotgun firing, ground machine gun firing at moving targets, and firing from the AT-6A airplane at targets towed behind other aircraft. During 1942, 9,117 gunners graduated from the school. At its peak, the school graduated classes of 4,000 students every 6 weeks. In 1944, the school's mission was broadened to include training copilots for four-engined aircraft. Early in 1945, B-29 gunnery and B-24 copilot training replaced the B-17 program.

Later that year, single-engine and fighter transition training were added, enabling P-39 and RP-63 fighters to practice attacks against bombers. At one time, bomber crews fired frangible bullets at heavily armored RP-63 fighters, providing realistic training. This program was suspended

because of the danger of the bullets entering the fighters' air cooling ducts. Flexible gunnery training was eliminated in 1945, and the field was inactivated in 1947.

Civilian activities at the field were moved to the new McCarren Field in 1948. The Las Vegas Army Air Base was reactivated in 1949 as the host of the Air Training Command's 3595th Pilot Training Wing for advanced single-engine training.

Also in 1949, a USAF Aircraft Gunnery School was established at the base. Its mission was to "train instructors in all phases of fighter gunnery, rocketry and dive bombing...to provide replacements for Air Force Fighter Units," and to "develop training methods and techniques on all related equipment." Eventually, this effort became the core of the Nellis program.

During the first year following reactivation, the base was a small-scale operation. As of June 1950, there were only 272 officers, 2,051 noncommissioned officers and airmen, and 438 civilians permanently assigned. Training was conducted in T-6 trainers and F-51 fighters.

The outbreak of the Korean War gave new impetus to fighter weapons training. Nellis AFB, as it was now called, expanded its fighter training to include combat crew refresher courses and postgraduate jet instructions. During the last 6 months of 1950, 164 students graduated from combat crew training and 21 from the fighter instructor course.

Operational testing and evaluation were begun in the 1950's and included the testing of some trainers, a rocket sight, and a drop tank. Indian Springs was reactivated in 1950 and

continued to serve as an emergency landing strip and service facility for the ranges. In 1953, Indian Springs was transferred to Air Research and Development Command.

During the early 1950's, jet aircraft maintenance (F-100, F-84, F-86) played a major role at Nellis AFB. Because of maintenance problems, some 530 civilian aircraft mechanics were hired to expand the maintenance team, and the F-84 program was transferred from Nellis AFB to Luke AFB. In 1956, the Air Force's official aerobatic demonstration team, the Thunderbirds, was reassigned from Luke AFB to Nellis AFB.

In 1958, the base was transferred from Air Training Command to Tactical Air Command. The 3595th Wing became the 4520th Combat Crew Training Wing (Tactical Fighter), and the Fighter Weapons School's 3595th School Squadron became the 4525th.

As a result of the transfer to the Tactical Air Command, squadron rotational training was added to combat crew and fighter weapons instructor preparation. The 4520th was given the mission of having additional forces available to the Air Defense Command in the event of an emergency. Operational testing and evaluations became increasingly important at Nellis AFB. The F-100 was tested with an air-to-air heat-seeking missile; low-angle and dive-toss bombing were evaluated; and M-116-A2 fire bombs and other equipment were tested. Nellis AFB ranges also received many improvements.

During the 1960's, permanent structures gradually began to replace the World War II temporary buildings. Plans were made for the new hospital, and many of those buildings retained were extensively renovated. Combat crew training

at Nellis AFB in the early 1960's emphasized conventional and nuclear bombing rather than air-to-air combat with enemy fighters. Much attention was given to dive, over-the-shoulder, and toss bombing techniques. The introduction of the F-105D fighter bomber program also stressed nuclear bombing. F-4 programs were added to the Nellis AFB training effort during this period. Indian Springs was placed back under the control of Nellis AFB in 1961.

In 1966, the Tactical Air Command reorganized Nellis AFB and established the Tactical Fighter Weapons Center to manage operational tests and evaluations, help define requirements for future equipment, coordinate the test tactics and procedures, and control the assigned forces. At the same time, the Fighter Weapons School was transformed into the 4525th Fighter Weapons Wing. The 4525th Fighter Weapons Wing has since been changed to the 57th, and the mission has grown.

PRIMARY MISSION

Nellis Air Force Base: Nellis Air Force Base is the largest base in the Tactical Air Command.

Men and women at Nellis AFB play a major role in helping TAC to perform its mission of organizing, training, and equipping tactical air forces within the U.S. while maintaining a reserve of combat-ready forces for deployment anywhere at any time.

The U.S. Air Force Tactical Fighter Weapons Center has a key role in maintaining the viability of the U.S. fighter forces all over the world. The center develops tactics to find the best ways to use the Air Force weapons systems and conducts operational tests and evaluations of new systems. The 4461st Support Group is assigned to the center.

The 57th Fighter Weapons Wing is the action agency for the center, providing the air crews and aircraft for conducting tests and evaluations.

The wing also conducts the U.S. Air Force Fighter Weapons School, producing instructors for units all over the world. This includes instruction in these Air Force first line fighters: the F-4 and F-111. Special squadrons of instructors use F-5's to teach combat pilots how to counter enemy tactics. The wing also provides Red Flag training in mass air operations for visiting units.

Tenant Missions

Tactical Fighter Weapons Center: The center functions directly under the Commander, Tactical Air Command. It participates in the development and introduction of new or improved tactics, techniques, and procedures pertaining to tactical fighters and fighter weapons systems. The center manages and conducts tests and evaluations, proposes concepts and doctrine while maintaining liaison with other tactical commands worldwide, conducts specialized training programs, and is responsible for the operations of the gunnery, bombing, and electronic warfare ranges.

57th Fighter Weapons Wing: The wing operates the Fighter Weapons School, conducts the tactical fighter doctrine and tactics course, conducts assigned operational tests and evaluations in support of the Tactical Fighter Weapons Center, trains selected air crews in specialized fighter tactics, and exercises operational control and command of the U.S. Air Force Air Demonstration Squadron (the Thunderbirds) and the 57th Fighter Weapons Wing. Major components include: USAF Fighter Weapons School; 4440th Tactical Fighter Training Group (Red Flag); 4513th Adversary Threat

Training Group, aggressor squadrons, test and evaluation squadrons, USAF Air Demonstration Squadron (Thunderbirds).

554th Operations Support Wing: The wing is responsible for the operation of the Nellis Bombing and Gunnery Ranges and for base support of all tenant units. Major components include: 554th Range Group; 554th Combat Support Group; 554th Civil Engineering, Transportation, Security Police Squadrons, the 554th Combat Support Squadron, and the USAF Hospital (Nellis).

474th Tactical Fighter Wing: The wing trains pilots in the F-16 aircraft and maintains combat-ready forces capable of rapid deployment worldwide.

820th Civil Engineering Squadron (Red Horse): The squadron supports the Commander in Chief, Air Force Readiness Command, and the Commander in Chief, Atlantic, with rapid deployment engineering operations. This unit also supports Tactical Air Command exercises and deployments, conducts range upgrading and base support with deployable heavy operations repair and construction units, repairs and upgrades assault strips and ranges, conducts training in operations, and is responsible for assisting in the maintenance and operation of Lake Mead Base (Nellis Area II).

Detachment 13, 4400th Management Engineering Squadron: Develops command and Air Force manning standards and maintains unit detail listings.

Detachment 16, 25th Weather Wing: Is reponsible for weather forecasting. The detachment offers service for flight planning through the use of highly skilled personnel and latest equipment.

Detachment 1812, Air Force Office of Special Investigation: Provides a professional criminal counterintelligence and special investigative service to all Nellis AFB activities. The mission extends across the spectrum of human behavior as it affects the security of the Air Force, the ethical conduct of its members, and the general propriety of its activities.

Detachment 4372, USAF Audit Agency: Provides all levels of Air Force management with an independent objective and constructive evaluation of the effectiveness and efficiency with which managerial responsibilities are carried out.

USAF Postal Service: Provides mail service for official business and military personnel at Nellis AFB.

Field Training Detachment 523: Provides technical training support to Nellis AFB personnel with classroom and on-the-job instruction. Training includes all aspects of training for various aircraft.

2069th Communication Squadron, Air Force Communications Service: Provides base long-haul communications, navigational aids, and air traffic control services to Nellis AFB and other agencies.

3096th Aviation Depot Squadron, Air Force Logistics Command: Maintains capability, provides in-transit and permanent storage of weapons, provides retrofit requirements, and makes technical assistance visits.

Detachment 1, 57th Fighter Weapons Wing: Provides aerial support for the Nevada Test Site and Department of Energy. Helicopters and personnel provide control of aircraft over the test site, aerial photography, closed-circuit television support, and aerial sampling.

First National Bank of Nevada, NAFB: Provides all banking services, including safe deposit boxes, drive-in banking, and trust department facilities in the 6,000-square-foot financial center.

Nellis Federal Credit Union: Provides saving and lending facilities for all military and civilian Federal employees and dependents in the Las Vegas area.

American National Red Cross: Provides general welfare and recreational servces for military personnel and their dependents assigned to Nellis Air Force Base.

Detachment 3, 1365th Audio Visual Squadron: Provides support for TAC Instruction Systems Development Program.

Defense Property Disposal Office, Nellis AFB, NV: Disposes of surplus government property located at Nellis AFB through utilization, donation, sale, or destruction.

Detachment 2, 3636 CCTW (ATC): Assists with Red Flag Survival Training.

Detachment 3, AFTEC: Provides liaison on test projects.

OLA HQ ARRS: Provides liaison on search and rescue training and operations.

U.S. Army Liaison Team: Red Flag liaison with U.S. Army.

Area Defense: Assists USAF personnel accused of military offenses with defense preparation.

Table D-1
RCRA PART A APPLICATIONS[a]
NELLIS AFB AND INDIAN SPRINGS AFAF

Facility	Description	Container Type
168	Nondestructive Inspection	Tank
191	Corrosion Control	Bowser
1014	Fuel Oil Storage	Tank
857	Engine Cleaning	Tank
460	Hazardous Storage	--[b]
171	Aircraft Wash Rack	Oil/water separator
415	AGE Maintenance (Service Rack)	
813	Vehicle Service Rack	Oil/water separator
814	Fuels Lab	Tank
837	Aircraft Wash Rack	Oil/water separator
840	Auto Hobby Shop	Oil/water separator
858	Engine Shop	Oil/water separator
831	Vehicle Maintenance	Oil/water separator
180	AGE Wash Rack	Oil/water separator
506	Base Exchange Service Station	Tank
Indian Springs		
225	Vehicle Maintenance	Bowser

[a]Waste oils, solvents, contaminated fuels generated.

[b]Spill contingency.

Appendix E
POL STORAGE TANKS

Table E-1
POL STORAGE TANKS AT NELLIS AFB AND
INDIAN SPRINGS AFAF

Facility	Volume (Gallons)	Liquid
Nellis AFB		
10301	2,000	Fuel Oil No. 2
10302	2,000	Fuel Oil No. 2
10304	2,000	Fuel Oil No. 2
10305	2,000	Fuel Oil No. 2
10307	10,000	Fuel Oil No. 2
10308	10,000	Fuel Oil No. 2
10412	2,000	Fuel Oil No. 2
10413	2,000	Fuel Oil No. 2
10414	2,000	Fuel Oil No. 2
10416	2,000	Fuel Oil No. 2
10418	2,000	Fuel Oil No. 2
10402	2,000	Fuel Oil No. 2
10403	2,000	Fuel Oil No. 2
10404	2,000	Fuel Oil No. 2
10406	2,000	Fuel Oil No. 2
10207	20,000	Fuel Oil No. 2
10237	550	Fuel Oil No. 2
10250	1,000	Fuel Oil No. 2
10116	3,000	Fuel Oil No. 2
10118	2,000	Fuel Oil No. 2
10120	2,000	Fuel Oil No. 2
10123	2,000	Fuel Oil No. 2
10108	550	Fuel Oil No. 2
10220	1,500	Fuel Oil No. 2
10121	2,000	Fuel Oil No. 2
1051	450,000	JP-4
1052	450,000	JP-4
1054	675,000	JP-4
1055	900,000	JP-4
939	12,000 (6 ea)	AVGAS
914	12,000	Solvent
914	12,000 (2 ea)	Diesel
2000	12,000	MOGAS
941	50,000 (2 ea)	JP-4
2098	2,000	JP-4
10114	50,000	Diesel
1014	20,000 (4 ea)	Contaminated fuel
1709	350	Gasoline
10113	500	Gasoline
490	1,000	Gasoline
498	350	Gasoline
1024	500	Gasoline

Table E-1 (cont.)

Facility	Volume	Liquid
839	12,000	Diesel
775	8,000	Diesel
10207	(not determined)	Diesel
625	20,000 (2 ea)	Diesel
567	10,000	Diesel
2060	50	Diesel
1602	150	Diesel
2069	100	Gasoline
2070	250	Diesel
805	35	Diesel
2078	50	Diesel
2074	200	Diesel
328	50	Diesel
170	50	Diesel
169	100	Diesel
589	500	Diesel
620	200	Diesel
625	1,000	Diesel
2079	160	Gasoline
781	50	Diesel
536	50	Gasoline
940	25,000 (4 ea)	MOGAS
830	5,000 (2 ea)	MOGAS
830	12,000 (2 ea)	MOGAS
830	5,000	Diesel
161	2,000	MOGAS
161	3,000	JP-4
1B-2B (Area II)	3,000 (2 ea)	MOGAS
3B (Area III)	6,000	MOGAS
814	2,000	Diesel
2001	1,000	Diesel
10112	1,000	Heating oil
10110	1,000	Heating oil
10309	10,000	Heating oil
10310	1,000	Heating oil
2002	10,000 (2 ea)	Waste POL
13091	5,000	Radioactive waste
Indian Springs		
653	2,500	JP-4
634	2,800	Diesel
635 (motor pool)	19,300	MOGAS
---	1,000 (6 ea.)	Road Oil
225	1,000	Fuel Oil
650	10,000	Diesel

Table E-1 (cont.)

Facility	Volume	Liquid
649	6,000	Propane
2 & 11	1,000	Fuel Oil
13	500	Fuel Oil
24	1,500	Fuel Oil
37	1,000	Fuel Oil
39	1,000	Fuel Oil
43	500	Fuel Oil
50	1,000	Fuel Oil
65	1,520	Fuel Oil
67	1,000	Fuel Oil
71	750	Fuel Oil
79	1,000	Fuel Oil
84	265	Fuel Oil
85	1,000	Fuel Oil
91	1,000	Fuel Oil
92	500	Fuel Oil
96	---	Fuel Oil
101	1,000	Fuel Oil
140	980	Fuel Oil
228	500	Fuel Oil
231	1,000	Fuel Oil
232	1,000	Fuel Oil
233	500	Fuel Oil
234	265	Fuel Oil
235	265	Fuel Oil
241	500	Fuel Oil
261	500	Fuel Oil
262	500	Fuel Oil
263	500	Fuel Oil
264	1,500	Fuel Oil
265	550	Fuel Oil

Appendix F
ABANDONED TANKS

Table F-1
ABANDONED POL TANKS AT INDIAN SPRINGS AFAF

Facility	Volume (gal.)	Past Liquid	Present Status
636 (service station)	15,000 ea. (2)	MOGAS	Filled with sand

Appendix G
OIL/WATER SEPARATORS

Table G-1
OIL/WATER SEPARATORS AT NELLIS AFB
AND INDIAN SPRINGS AFAF

Facility	Estimated Quantity Pumped per Month (gal)[a]	Potentially Hazardous Liquid
171	4,000	yes[b]
312 (grease trap)	45	no
324 (grease trap)	800	no
350 (grease trap)	1,200	no
541	900	no
567 (grease trap)	1,600	no
625 (grease trap)	1,000	no
705 (grease trap)	700	no
831	1,200	yes[b]
10206 (grease trap)	200	no
814	900	yes[b]
151 (2 tanks)	450 (total)	no
170 (2 tanks)	250 (total)	yes
175	3,000	yes
178	3,000	no
180	5,000	yes[b]
191	550	no
192	550	no
193	550	no
194	100	no
196	300	no
198	300	no
173 (4 tanks)	170 (total)	yes[b]
202	550	no
204	550	no
206	550	no
208	550	no
415 (3 tanks)	1,100 (total)	yes[b]
506 (2 tanks)	450 (total)	yes[b]

Table G-1 (cont.)

Facility	Estimated Quantity Pumped per Month (gal)[a]	Potentially Hazardous Liquid
199	100	yes
835	200	yes
813	2,400	yes[b]
831 (2 hydraulic pits)	500 (total)	yes
831 (1 floor drum raceway)	100	yes
837	500	yes[b]
840	100	yes[b]
854	500	yes
857	400	yes[b]
858	2,500	yes[b]
10119	2,500	yes[b]
10600	1,000	yes[b]
62111	400	yes[b]
P 225 (Indian Springs)	500	yes[b]
P 71 (grease trap) (Indian Springs)	200	no
2098 (washrack)	150	no
168 (4 tanks)	300 (total)	yes[b]

[a]Based on 1982 field survey.

[b]RCRA application submitted.

Appendix H

SITE HAZARD EVALUATION METHODOLOGY

HQ AIR FORCE ENGINEERING AND SERVICES CENTER
AND
USAF OCCUPATIONAL AND ENVIRONMENTAL HEALTH LABORATORY

SITE RATING METHODOLOGY

FOR

PHASE I
INSTALLATION RESTORATION PROGRAM

July 1981

SITE RATING METHODOLOGY
FOR
PHASE I INSTALLATION RESTORATION PROGRAM

1. This site rating methodology for Phase I of the Installation Restoration Program (IRP) has been jointly developed by CH2M HILL and Engineering-Science based on experience in performing Record Searches at several Air Force installations. This standard site rating system should be used for all Air Force IRP Records Search efforts to assist in Air Force prioritization and commitment of resources for Phase II survey actions.

2. The basis for the rating system is the document developed by JRB Associates, Inc. for the EPA Hazardous Waste Enforcement office. The JRB system was modified to accurately address specific Air Force installation conditions and to provide meaningful comparison of land fills and contaminated areas other than landfills.

3. Questions pertaining to use of the Air Force Site Rating Methodology should be addressed to either Mr. Lindenberg, AFESC/DEVP, AUTOVON 970-6189 (Commercial (904) 283-6189) or Major Fishburn, USAF OEHL/EC, AUTOVON 240-3305 (Commercial (512) 536-3305).

Note: Both CH2M HILL and Engineering-Science are Engineering Support contractors for the US Air Force.

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site _____

Location _____

Owner/Operator _____

Comments _____

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet		4		
Distance to Nearest Drinking Water Well		15		
Distance to Reservation Boundary		6		
Land Use/Zoning		3		
Critical Environments		12		
Water Quality of Nearby Surface Water Body		6		
Number of Assumed Values = _____ Out of 6		SUBTOTALS	_____	_____
Percentage of Assumed Values = _____\		SUBSCORE		_____
Number of Missing Values = ____Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____\				

PATHWAYS				
Evidence of Water Contamination		10		
Level of Water Contamination		15		
Type of Contamination, Soil/Biota		5		
Distance to Nearest Surface Water		4		
Depth to Groundwater		7		
Net Precipitation		6		
Soil Permeability		6		
Bedrock Permeability		4		
Depth to Bedrock		4		
Surface Erosion		4		
Number of Assumed Values = ____ Out of 10		SUBTOTALS	_____	_____
Percentage of Assumed Values = ____ \		SUBSCORE		_____
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____\				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE _____

Reason for Assigned Hazardous Rating:

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site		7		
Hazardous Waste Quantity		7		
Total Waste Quantity		4		
Waste Incompatibility		3		
Absence of Liners or Confining Beds		6		
Use of Leachate Collection System		6		
Use of Gas Collection Systems		2		
Site Closure		8		
Subsurface Flows		7		
		SUBTOTALS	_____	_____
		SUBSCORE		_____

Number of Assumed Values = ____ Out of 9

Percentage of Assumed Values = ____%

Number of Missing and Non-Applicable Values = ____ Out of 9

Percentage of Missing and Non-Applicalbe Values = ____%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ____ Out of 25

Overall Percentage of Assumed Values = ____%

OVERALL SCORE _____

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

RATING FACTOR SYSTEM GUIDELINES				
RECEPTORS				
	Rating Scale Levels			
Rating Factors	0	1	2	3
Population within 1,000 Feet	0	1 to 25	26 to 100	Greater than 100
Distance to Nearest Drinking Water Well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet
Distance to Reservation Boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet
Land Use/Zoning	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential
Critical Environments	Not a critical environment	Pristine natural areas	Wetlands; flood plains, and preserved areas; presence of economically important natural resources	Major habitat of an endangered or threatened species; presence of recharge area
Water Quality Designation of Nearest Surface Water Body	Agricultural or industrial use	Recreation, propagation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies
	PATHWAYS			
Evidence of Water Contamination	No contamination	Indirect evidence	Positive proof from direct observation	Positive proof from laboratory analyses
Level of Water Contamination	No contamination	Low levels, trace levels, or levels less than maximum contaminant level (MCL) or EPA drinking water standards	Moderate levels or levels near MCL or EPA drinking water standards	High levels greater than MCL or EPA drinking water standards
Type of Contamination Soil/Biota	No contamination	Suspected contamination	Moderate contamination	Severe contamination
Distance to Nearest Surface Water	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet
Depth to Ground Water	Greater than 500 feet	51 to 500 feet	11 to 50 feet	0 to 10 feet
Net Precipitation	Less than −10 inches	−10 to +5 inches	+5 to +20 inches	Greater than +20 inches
Soil Permeability	Greater than 50% clay ($<10^{-6}$ cm/s)	30% to 50% clay (10^{-4} to 10^{-6} cm/s)	15% to 30% clay (10^{-2} to 10^{-4} cm/s)	0% to 15% clay ($>10^{-2}$ cm/s)
Bedrock Permeability	Impermeable ($<10^{-6}$ cm/s)	Relatively impermeable (10^{-4} to 10^{-6} cm/s)	Relatively impermeable (10^{-2} to 10^{-4} cm/s)	Very permeable ($>10^{-2}$ cm/s)
Depth to Bedrock	Greater than 60 feet	31 to 60 feet	11 to 30 feet	0 to 10 feet
Surface Erosion	None	Slight	Moderate	Severe

WASTE CHARACTERISTICS

Judgemental hazardous rating from 30 to 100 points based on the following guidelines:

Points	Condition
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantities of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

WASTE MANAGEMENT PRACTICES

	Rating Scale Levels			
Rating Factors	0	1	2	3
Record Accuracy and Ease of Access to Site	Accurate records, no unauthorized dumping	Accurate records, no barriers	Incomplete records, no barriers	No records, no barriers
Hazardous Waste Quantity	<1 ton	1 to 5 tons	5 to 20 tons	>20 tons
Total Waste Quantity	0 to 10 acre feet	11 to 100 acre feet	101 to 250 acre feet	Greater than 250 acre feet
Waste Incompatibility	No incompatible wastes are present	Present, but does not pose a hazard	Present and may pose a future hazard	Present and posing an immediate hazard
Absence of Liners or Confining Strata	Liner and confining strata	Liner or confining strata	Low quality liner or low permeability strata	No liner, no confining strata
Use of Leachate Collection Systems	Adequate collection and treatment	Inadequate collection or treatment	Inadequate collection and treatment	No collection or treatment
Use of Gas Collection Systems	Adequate collection and treatment	Collection and controlled flaring	Venting or inadequate treatment	No collection or treatment
Site Closure	Impermeable cover	Low permeability cover	Permeable cover	Abandoned site, no cover
Subsurface Flows	Bottom of landfill greater than 5 feet above high ground-water level	Bottom of landfill occasionally submerged	Bottom of fill frequently submerged	Bottom of fill located below mean ground-water level

Appendix I

SITE ASSESSMENT AND RATING FORMS

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 1 - Base Landfill
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Industrial & domestic landfill, demolition debris

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	84	138
Percentage of Assumed Values = ____%		SUBSCORE		61
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				
PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination	1	15	15	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	47	195
Percentage of Assumed Values = ____%		SUBSCORE		24
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 90

Reason for Assigned Hazardous Rating:
Long term base landfill

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	3	7	21	21
Total Waste Quantity	3	4	12	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	115	150
		SUBSCORE		77

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25
Overall Percentage of Assumed Values = 8%

OVERALL SCORE 61

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 2 - Base Landfill
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Industrial & domestic landfill, demolition debris

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	54	138
Percentage of Assumed Values = ____%		SUBSCORE		39
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
Number of Assumed Values = ____ Out of 10		SURTOTALS	22	195
Percentage of Assumed Values = ____%		SURSCORE		11
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
Short term base landfill

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	2	7	14	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	85	150
		SUBSCORE		57

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 42

(Receptors Subscore x 0.22 plus
Pathways Subscore x 0.30 plus
Waste Characteristics Subscore x 0.24 plus
Waste Management Subscore x 0.24)

[illegible] SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 3 - Base Landfill
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Industrial and domestic landfill

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	33	138
Percentage of Assumed Values = ____%		SUBSCORE		24
Number of Missing Values = __ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
Number of Assumed Values = ___ Out of 10		SUBTOTALS	22	195
Percentage of Assumed Values = ___%		SUBSCORE		11
Number of Missing Values = ___ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ___%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
Short term base landfill

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	2	7	14	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	85	150
		SUBSCORE		57

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 39

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 15 - Storm Drain Gully
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Flight line surface runoff gully

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	18
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	81	138
Percentage of Assumed Values = ____%		SUBSCORE		59
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	22	195
Percentage of Assumed Values = ____%		SUBSCORE		11
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	2	7	14	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	NA	6	—	—
Use of Gas Collection Systems	NA	2	—	—
Site Closure	NA	8	—	—
Subsurface Flows	NA	7	—	—
		SUBTOTALS	60	81
		SUBSCORE		74

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 54

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 17 - STP Percolation Ponds
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Industrial, domestic wastewater including POL, solvents

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	84	138
Percentage of Assumed Values = ____%		SUBSCORE		61
Number of Missing Values = __ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	2	10	20	30
Level of Water Contamination	2	15	30	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	72	195
Percentage of Assumed Values = ____%		SUBSCORE		37
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:
biological degradation of majority of wastes

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	1	7	7	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	97	150
		SUBSCORE		65

Number of Assumed Values = 2 Out of 9
Percentage of Assumed Values = 22%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 2 Out of 25
Overall Percentage of Assumed Values = 8%

OVERALL SCORE 55

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 18 - Abandoned Fire Training
Location Nellis AFB
Owner/Operator Nellis AFB
Comments POL, solvent burning

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	53	138
Percentage of Assumed Values = ____%		SUBSCORE		38
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

?	PATHWAYS			
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	18	195
Percentage of Assumed Values = ____%		SUBSCORE		9
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:
Small quantities, burned

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	1	7	7	21
Total Waste Quantity Assume	1	4	4	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems N.A.	-	2	-	-
Site Closure	1	8	8	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	79	144
		SUBSCORE		55

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33%
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicable Values = 11%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 3 Out of 25
Overall Percentage of Assumed Values = 12%

OVERALL SCORE 39

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 19- Abandoned Fire Training
Location Nellis AFB
Owner/Operator Nellis AFB
Comments POL, Solvent burning

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	3	3	9	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
		SUBTOTALS	53	138
		SUBSCORE		38

Number of Assumed Values = ____ Out of 6
Percentage of Assumed Values = ____%
Number of Missing Values = ____ Out of 6
Percentage of Missing Values = ____%

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
		SUBTOTALS	18	195
		SUBSCORE		9

Number of Assumed Values = ____ Out of 10
Percentage of Assumed Values = ____%
Number of Missing Values = ____ Out of 10
Percentage of Missing Values = ____%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating: Small quantities, burned

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity - Assume	1	7	7	21
Total Waste Quantity - Assume	1	4	4	12
Waste Incompatibility - Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems - N.A.	-	2	-	-
Site Closure	1	8	8	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	79	144
		SUBSCORE		55

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 3 Out of 25
Overall Percentage of Assumed Values = 12

OVERALL SCORE 39

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 20 East Fire Training
Location: Nellis AFB
Owner/Operator: Nellis AFB
Comments: POL, Solvent burning

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	2	4	8	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	1	3	3	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	59	138
Percentage of Assumed Values = ____%		SUBSCORE		43
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	18	195
Percentage of Assumed Values = ____%		SUBSCORE		9
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:
Large quantities but burned
Land farmed

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	2	7	14	21
Total Waste Quantity Assume	2	4	8	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems N.A.	—	2	—	—
Site Closure	1	8	8	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	90	144
		SUBSCORE		62

Number of Assumed Values = 3 Out of 9
Percentage of Assumed Values = 33
Number of Missing and Non-Applicable Values = 1 Out of 9
Percentage of Missing and Non-Applicalbe Values = 11

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = 3 Out of 25
Overall Percentage of Assumed Values = 12

OVERALL SCORE 46

(Receptors Subscore x 0.22 plus
Pathways Subscore x 0.30 plus
Waste Characteristics Subscore x 0.24 plus
Waste Management Subscore x 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 23 - Leach Field
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Septic tank leach field for auto hobby shop

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	67	138
Percentage of Assumed Values = ____%		SUBSCORE		49
Number of Missing Values = __ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	18	195
Percentage of Assumed Values = ____%		SUBSCORE		9
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
potentially small volumes of POL

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	1	7	7	21
Total Waste Quantity	1	4	4	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	NA	6	—	—
Use of Gas Collection Systems	NA	2	—	—
Site Closure	NA	8	—	—
Subsurface Flows	NA	7	—	—
		SUBTOTALS	53	81
		SUBSCORE		65

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 41

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 24 - Fuel Tank Sludge Burial
Location Nellis AFB
Owner/Operator Nellis AFB
Comments
JP-4 and leaded fuel sludge.

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	3	3	18	18
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	85	138
Percentage of Assumed Values = ____%		SUBSCORE		62
Number of Missing Values = __ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	1	10	10	30
Level of Water Contamination	1	15	15	45
Type of Contamination, Soil/Biota	2	5	10	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
Number of Assumed Values = ___ Out of 10		SUBTOTALS	48	195
Percentage of Assumed Values = ___%		SUBSCORE		25
Number of Missing Values = ___ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ___%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
Maximum of 25,000 gal of JP-4/leaded fuel sludge

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity (Assume)	3	7	21	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility (Assume)	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	103	150
		SUBSCORE		69

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 54

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

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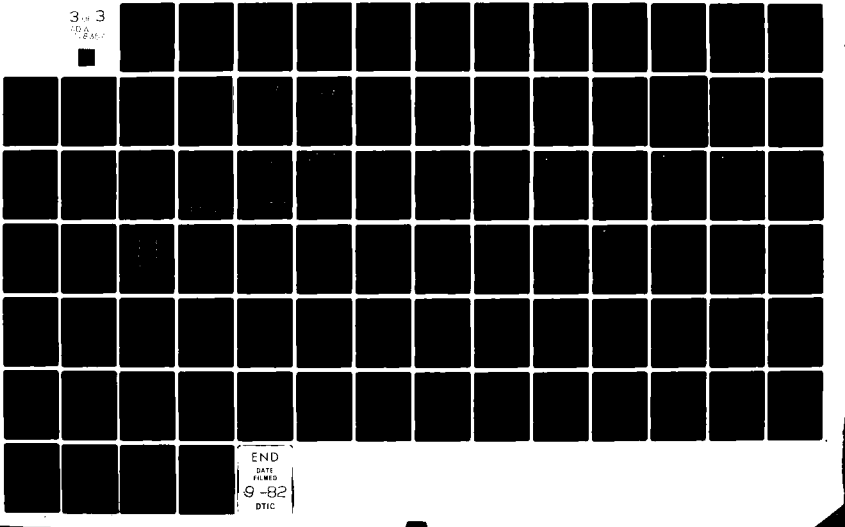
WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 27- Waste POL Tank
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Leaking waste POL tank

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	14
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	67	138
Percentage of Assumed Values = ____%		SUBSCORE		49
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	2	5	10	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4		
Number of Assumed Values = ___ Out of 10				
Percentage of Assumed Values = ___%				
Number of Missing Values = ___ Out of 10				
Percentage of Missing Values = ___%				

AD-A118 357 CH2M HILL GAINESVILLE FL F/G 13/2
INSTALLATION RESTORATION PROGRAM RECORDS SEARCH FOR NELLIS AIR --ETC(U)
JUN 82 F08637-80-G-0010
UNCLASSIFIED NL



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WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 60

Reason for Assigned Hazardous Rating:
Maximum of 1200 gal of waste POL

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	1	7	7	21
Hazardous Waste Quantity	1	7	7	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	NA	6	—	—
Use of Gas Collection Systems	NA	2	—	—
Site Closure	NA	8	—	—
Subsurface Flows	NA	7	—	—
		SUBTOTALS	35	81
		SUBSCORE		43

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 36

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 28 - Fuel Spill
Location Nellis AFB
Owner/Operator Nellis AFB
Comments Two 2,000 gal JP-4 spills

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	3	4	12	12
Distance to Nearest Drinking Water Well	2	15	30	45
Distance to Reservation Boundary	2	6	12	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
		SUBTOTALS	60	138
		SUBSCORE		43

Number of Assumed Values = ____ Out of 6
Percentage of Assumed Values = ____%
Number of Missing Values = ____ Out of 6
Percentage of Missing Values = ____%

(Factor Score Divided by Maximum Score and Multiplied by 100)

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
		SUBTOTALS	18	195
		SUBSCORE		9

Number of Assumed Values = ____ Out of 10
Percentage of Assumed Values = ____%
Number of Missing Values = ____ Out of 10
Percentage of Missing Values = ____%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 80

Reason for Assigned Hazardous Rating:

4000 gal JP-4 (spilled)

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	2	7	14	21
Hazardous Waste Quantity	2	7	14	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility Assume	0	3	0	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	NA	6	—	—
Use of Gas Collection Systems	NA	2	—	—
Site Closure	NA	8	—	—
Subsurface Flows	NA	7	—	—
		SUBTOTALS	46	81
		SUBSCORE		57

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicaibe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 45

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 1 - Base Landfill
Location: Small Arms Range
Owner/Operator: Nellis AFB
Comments: Industrial and domestic landfill

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	33	138
Percentage of Assumed Values = ____%		SUBSCORE		24
Number of Missing Values = __ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	2	4	8	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	26	195
Percentage of Assumed Values = ____%		SUBSCORE		13
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
Short term base landfill

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity . Assume	2	7	14	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	69	150
		SUBSCORE		46

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 33

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 2 - Base Landfill
Location: Small Arms Range
Owner/Operator: Nellis AFB
Comments: Industrial and domestic landfill

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	33	138
Percentage of Assumed Values = ____%		SUBSCORE		24
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	2	4	8	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	26	195
Percentage of Assumed Values = ____%		SUBSCORE		13
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
Short term base landfill

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	2	7	14	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	69	150
		SUBSCORE		46

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 33

(Receptors Subscore x 0.22 plus
Pathways Subscore x 0.30 plus
Waste Characteristics Subscore x 0.24 plus
Waste Management Subscore x 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 6 - Radioactive Waste Pits
Location: Small Arms Range
Owner/Operator: Nellis AFB
Comments:

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
Number of Assumed Values = ____ Out of 6		SUBTOTALS	33	138
Percentage of Assumed Values = ____%		SUBSCORE		24
Number of Missing Values = ____ Out of 6		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	2	4	8	12
Number of Assumed Values = ____ Out of 10		SUBTOTALS	26	195
Percentage of Assumed Values = ____%		SUBSCORE		13
Number of Missing Values = ____ Out of 10		(Factor Score Divided by Maximum Score and Multiplied by 100)		
Percentage of Missing Values = ____%				

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 50

Reason for Assigned Hazardous Rating:
10 to 20 auger holes for radioactive waste

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	0	7	0	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	NA	6	—	—
Use of Gas Collection Systems	NA	2	—	—
Site Closure	NA	8	—	—
Subsurface Flows	NA	7	—	—
		SUBTOTALS	42	81
		SUBSCORE		52

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 34

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site No. 1- Field Landfill
Location Indian Springs AFAF
Owner/Operator Indian Springs AFAF
Comments Industrial and domestic landfill

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	0	4	0	12
Distance to Nearest Drinking Water Well	1	15	15	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	0	3	0	9
Critical Environments	0	12	0	36
Water Quality of Nearby Surface Water Body	0	6	0	18
		SUBTOTALS	33	138
		SUBSCORE		24

Number of Assumed Values = _____ Out of 6
Percentage of Assumed Values = _____%
Number of Missing Values = _____ Out of 6
Percentage of Missing Values = _____%

(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	1	4	4	12
		SUBTOTALS	22	195
		SUBSCORE		11

Number of Assumed Values = _____ Out of 10
Percentage of Assumed Values = _____%
Number of Missing Values = _____ Out of 10
Percentage of Missing Values = _____%

(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
Long term field landfill

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	2	7	14	21
Total Waste Quantity	2	4	8	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	3	6	18	18
Use of Gas Collection Systems	3	2	6	6
Site Closure	2	8	16	24
Subsurface Flows	0	7	0	21
		SUBTOTALS	104	150
		SUBSCORE		69

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 42

(Receptors Subscore X 0.22 plus
Pathways Subscore X 0.30 plus
Waste Characteristics Subscore X 0.24 plus
Waste Management Subscore X 0.24)

WASTE DISPOSAL SITE AND SPILL AREA ASSESSMENT AND RATING FORM

Name of Site: No. 5 - Fire Training Area
Location: Indian Springs AFAF
Owner/Operator: Indian Springs AFAF
Comments:

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
RECEPTORS				
Population Within 1,000 Feet	1	4	4	12
Distance to Nearest Drinking Water Well	3	15	45	45
Distance to Reservation Boundary	3	6	18	18
Land Use/Zoning	2	3	6	9
Critical Environments	0	12	0	24
Water Quality of Nearby Surface Water Body	0	6	0	18
		SUBTOTALS	73	138
		SUBSCORE		53

Number of Assumed Values = _____ Out of 6
Percentage of Assumed Values = _____%
Number of Missing Values = _____ Out of 6
Percentage of Missing Values = _____%
(Factor Score Divided by Maximum Score and Multiplied by 100)

PATHWAYS				
Evidence of Water Contamination	0	10	0	30
Level of Water Contamination	0	15	0	45
Type of Contamination, Soil/Biota	1	5	5	15
Distance to Nearest Surface Water	0	4	0	12
Depth to Groundwater	1	7	7	21
Net Precipitation	0	6	0	18
Soil Permeability	1	6	6	18
Bedrock Permeability	0	4	0	12
Depth to Bedrock	0	4	0	12
Surface Erosion	0	4	0	12
		SUBTOTALS	18	195
		SUBSCORE		9

Number of Assumed Values = _____ Out of 10
Percentage of Assumed Values = _____%
Number of Missing Values = _____ Out of 10
Percentage of Missing Values = _____%
(Factor Score Divided by Maximum Score and Multiplied by 100)

WASTE CHARACTERISTICS

Hazardous Rating: Judgemental rating from 30 to 100 points based on the following guidelines:

Points	
30	Closed domestic-type landfill, old site, no known hazardous wastes
40	Closed domestic-type landfill, recent site, no known hazardous wastes
50	Suspected small quantities of hazardous wastes
60	Known small quantities of hazardous wastes
70	Suspected moderate quantities of hazardous wastes
80	Known moderate quantites of hazardous wastes
90	Suspected large quantities of hazardous wastes
100	Known large quantities of hazardous wastes

SUBSCORE 70

Reason for Assigned Hazardous Rating:
long term fire training area

WASTE MANAGEMENT PRACTICES

RATING FACTOR	FACTOR RATING (0-3)	MULTIPLIER	FACTOR SCORE	MAXIMUM POSSIBLE SCORE
Record Accuracy and Ease of Access to Site	3	7	21	21
Hazardous Waste Quantity Assume	1	7	7	21
Total Waste Quantity	0	4	0	12
Waste Incompatibility Assume	1	3	3	9
Absence of Liners or Confining Beds	3	6	18	18
Use of Leachate Collection System	NA	6	—	—
Use of Gas Collection Systems	NA	2	—	—
Site Closure	NA	8	—	—
Subsurface Flows	NA	7	—	—
		SUBTOTALS	49	81
		SUBSCORE		60

Number of Assumed Values = ___ Out of 9
Percentage of Assumed Values = ___%
Number of Missing and Non-Applicable Values = ___ Out of 9
Percentage of Missing and Non-Applicalbe Values = ___%

(Factor Score Divided by Maximum Score and Multiplied by 100)

Overall Number of Assumed Values = ___ Out of 25
Overall Percentage of Assumed Values = ___%

OVERALL SCORE 43

(Receptors Subscore x 0.22 plus
Pathways Subscore x 0.30 plus
Waste Characteristics Subscore x 0.24 plus
Waste Management Subscore x 0.24)

Appendix J
HERBICIDE AND OTHER PESTICIDE USAGE

Table J-1
HERBICIDE AND OTHER PESTICIDE USAGE

Chemical Name	Use
Current	
Avitrol	Bird control; Air Force (AF) structures
Baygon	Insecticide; AF structures
Carbaryl	--
Chlordane	Insecticide; housing areas
Diazinon	Insecticide; AF structures
Diphacinone	Rodenticide; AF structures
D-Phenothrin	Insecticide; AF structures
Dursban M	Insecticide
Ficam	Insecticide
Malathion	Insecticide; AF structures
Naphthalene	Insecticide; housing area, AF structures
Promar	Rodenticide; AF structures
Sevin	Insecticide; AF structures
Krovar I	Herbicide; fence lines, airfield
Ortho Paraquat CL	Herbicide; pavement, airfield, fence lines
Princep	Herbicide
Pyrethrum	Insecticide; AF structures, housing areas
Dalapon	Herbicide
Vapona-B	--
Past	
Bromacil	--
Lindane	Insecticide; housing areas
2,4-D	--
Diuron	--
Dalapon	--
DDT	Insecticide; housing areas
Bormonuro	--
Oil	Herbicide; roadways
Zinc phosphide	--

Source: Various documents.

Appendix K

FEDERAL SPECIFICATION P-D-680

09-13-17

P-D-680
AMENDMENT—2
June 5, 1964

SUPERSEDING
Amendment—1
August 27, 1963

FEDERAL SPECIFICATION

DRY CLEANING SOLVENT

This amendment, which forms a part of Federal Specification P-D-680, dated March 27, 1963, was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

Page 2, table I: Delete "Color, Saybolt, not greater than" and substitute "Color, Saybolt, not darker than".

Page 2, table I, Under distillation range: Delete "50% distilled by vol., min." and substitute "Minimum 50 percent distilled, °F.".

MILITARY INTERESTS:

Army—MU MR GL

Navy—Sh

Air Force—MAAMA

☆ U. S. GOVERNMENT PRINTING OFFICE: 1964-341-519/A-6426

FSC 6850

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09-13-17

P-D-680
AMENDMENT-1
August 27, 1963

FEDERAL SPECIFICATION

DRY CLEANING SOLVENT

This amendment, which forms a part of Federal Specification, P-D-680, dated March 27, 1963, was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

Page 2, Table I: Delete "Color, Saybolt, not greater than" and substitute "Color, Saybolt, not darker than".

MILITARY INTERESTS:
Army—MU MR GL
Navy—Sh
Air Force—MAAMA

FSC 6850

* U.S. GOVERNMENT PRINTING OFFICE 1963—703340/50

09-15-17

P-D-680
March 27, 1963

SUPERSEDING
Int. Fed. Spec. P-S-00661c(GSA-FSS)
June 13, 1962 and
Fed. Spec. P-S-661b
April 6, 1953

FEDERAL SPECIFICATION

DRY CLEANING SOLVENT

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers two types of petroleum distillates employed for dry cleaning of textile materials, and referred to industrially as "Stoddard Solvent" and as "140° F. Solvent".

1.2 Classification.

1.2.1 *Types.* Dry-cleaning solvent shall be of the following types, as specified:

Type I.—100°F. Solvent (Stoddard Solvent).

Type II.—140°F. Solvent.

2. APPLICABLE SPECIFICATIONS, STANDARDS, AND OTHER PUBLICATIONS

2.1 Specifications and Standards. The following specifications and standards, of the issues in effect on date of invitation for bids, form a part of this specification:

Federal Standards:

Fed. Std. No. 102—Preservation, Packaging, and Packing Levels.
Fed. Std. No. 123—Marking for Domestic Shipment (Civilian Agencies).
Fed. Test Method Std. No. 791—Lubricants, Liquid Fuels, and Related Products; Methods of Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications, Standards, and Handbooks and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, and Auburn, Wash.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications, Standards, and Handbooks from established distribution points in their agencies.)

Military Standards:

MIL-STD-105—Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129—Marking for Shipment and Storage.
MIL-STD-290—Packaging, Packing and Marking of Petroleum and Related Products.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

FSC 6850

1

2.2 Other publications. The following publications form a part of this specification. Unless otherwise indicated, the issues in effect on date of invitation for bids shall apply:

American Society for Testing and Materials Publication:

Part 7—Petroleum Products and Lubricants.

(Copies may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.)

Uniform Classification Committee Publication:

Uniform Freight Classification Rules.

(Application for copies should be addressed to Uniform Classification Committee, 202 Union Station, Chicago 6, Illinois.)

3. REQUIREMENTS

3.1 Material. The material shall be a petroleum distillate.

3.2 Physical and chemical properties. The physical and chemical properties of the solvents shall conform to the requirements specified in table I.

3.3 Workmanship. The dry cleaning solvent shall be clear, free from suspended matter and undissolved water as determined by visual inspection.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

TABLE I. *Physical and chemical properties*

	Type I	Type II	Test Para.
Appearance	Clear, free from suspended matter, and undissolved water		4.4.2
Color, Saybolt, not greater than ...	21	21	
Odor	Sweet	Sweet	4.4.3
Corrosion of copper strip 212° F. for 3 hours	Slight tarnish[1]		
Distillation range:			
Initial boiling pt., min.	300° F.	350° F.	
50% distilled by vol., min.	350° F.	375° F.	
End point, max. .	410° F.	415° F.	
Distillation residue, max.	1.5%	1.5%	4.4.4
Acidity-reaction of residue to methyl orange	Neutral	Neutral	4.4.5
Doctor test	Negative	Negative	4.4.1
Flash Point, Tag Closed Cup, min.	100° F.	138° F.	4.4.1
Sulfuric acid absorption, max. ..	5%	5%	4.4.1

[1] Shall correspond to classification number 1 of ASTM designation D 130.

4.2 Sampling.

4.2.1 *Lot.* For purposes of sampling, a lot shall consist of solvents from one batch or tank offered for delivery at one time. If material cannot be identified by batch or tank, a lot shall consist of not more than 10,000 gallons offered for delivery at one time.

4.2.2 *Sampling for inspection of containers.* A random sample of filled containers shall be taken by the Government inspector in accordance with Military Standard MIL-

STD-105 at inspection level I and acceptable quality level = 2.5 percent defective to verify compliance with this specification in regard to fill, closure, marking, and other requirements not involving tests.

4.2.3 *Sampling for tests.* From each inspection lot (see 4.2.1), the inspector shall take two containers at random. From each of the two containers 1-quart specimens shall be taken and placed in separate, clean, dry, metal, or glass containers, and then sealed, marked, and forwarded to the testing laboratory designated by the procuring activity.

4.3 Inspection of containers. Each sample filled container shall be examined for defects of construction of the container and the closure, for evidence of leakage, and for unsatisfactory markings; each filled container shall be weighed to determine the amount of contents. Any container in the sample having one or more defects, or under required fill, shall be rejected and if the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected.

4.4 Test procedures

4.4.1 *Physical and chemical properties.* These determinations shall be made in accordance with the methods specified in table II.

TABLE II. *Test procedures*

	Applicable method in Fed. Test Method Std. No. 791	Test method paragraph	Requirement paragraph
Appearance	—	4.4.2	Table I
Color	101.6	—	Table I
Odor	—	4.4.3	Table I
Copper Corrosion	5325.2	—	Table I
Distillation			
Distillation range	1001.9		Table I
Distillation residue		4.4.4	Table I
Acidity	—	4.4.5	Table I
Doctor test	5203.2	—	Table I
Flash point	1101.5	—	Table I
Sulfuric Acid Absorption	(See Note)	—	

Note: Determine according to ASTM D484-52.

4.4.2 *Appearance.* Examine the solvent for undissolved water, sediment and suspended matter by the use of transmitted light.

4.4.3 *Odor.* If the odor is questionable the following test shall be performed. Desized and laundered bleached cotton cloth of 3.6 to 4.0 ounces per square yard shall be used for this test. The cloth when lightly steamed shall have no odor except that of clean cotton cloth. The cloth shall be conditioned at 50 to 80 percent R.H. and 65° to 90°F. for 4 hours. A piece of the conditioned cloth approximately 12 inches square shall be placed in 100 milliliters of solvent so as to be completely submerged, and allowed to soak for 5 minutes. The cloth shall then be removed, drained, but not squeezed or extracted and hung at room temperature for 2 hours. The cloth shall then be dried in a stream of fresh air heated to 140° to 160° F. (60° to 71°C.) for 1 hour. The odor of the dried cloth when steamed over boiling water for 4 to 5 seconds, shall not differ from that of an untreated sample similarly steamed.

4.4.4 *Distillation residue.* Pour the distillation residue from the flask into a small cylinder graduated to 0.1 milliliter. Cool, measure and record the volume as residue.

4.4.5 *Acidity.* Make this test immediately after recording the volume of distillation residue. Transfer the cooled residue to a test tube, add three volumes of distilled water, and shake the tube thoroughly. Allow the mixture to separate and remove the aqueous layer to a clean test tube by means of a pipette. Add 1 drop of 0.1 percent aqueous solution of methyl orange. A pink or red color indicates the presence of mineral acid.

5. PREPARATION FOR DELIVERY

For civil agency procurement, the definitions and applications of the levels of packaging and packing shall be in accordance with Fed. Std. No. 102.

5.1 Packaging and packing.

5.1.1 *Levels A and B.* The solvent shall be packaged and packed in accordance with MIL-STD-290 as specified for the applicable level (see 6.2).

5.1.2 *Level C.* Commercial unit and bulk containers shall be packed so as to be acceptable by common or other carriers for safe transportation to point of destination specified in shipping instruction at the lowest transportation rate.

5.2 Marking.

5.2.1 *Civil agencies.* In addition to any special marking required by the contract or order, marking for shipment shall be in accordance with Fed. Std. No. 123.

5.2.2 *Military agencies.* In addition to any special marking required by the contract or order, marking for shipment shall be in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The product is intended for use as a dry-cleaning solvent.

6.1.1 Type I is intended for use as a comparatively safe dry-cleaning solvent.

6.1.2 Type II is intended for use in dry-cleaning plants where a solvent with a higher flash-point is desirable as an additional safety factor.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number and date of this specification.

(b) Type of solvent required (see 1.2).

(c) Size of containers and level of protection required (see 5.1 and 5.2).

6.3 Purchase unit. The solvent shall be purchased by volume, the unit being a U.S. gallon of 231 cubic inches at 60°F. (15.6°C.). The volume may be determined by dividing the net weight, in pounds, by the weight per gallon.

6.4 Transportation description. Transportation descriptions and minimum weights applicable to this commodity are:

Rail:

Chemicals, not otherwise indexed by name.

Carload minimum weight 24,000 pounds, subject to Rule 34, Uniform Freight Classification.

Motor:

Chemicals, not otherwise indexed.

Truckload minimum weight 24,000 pounds, subject to Rule 115, National Motor Freight Classification.

6.5 Certification. Solvent delivered in cans, drums, or tank cars shall either be accompanied by an official gager's certificate showing the net contents of each container and also the temperature of the contents at the time of gaging or shall be subject to gaging by the Government inspector. In the absence of a statement of the temperature at the time of gaging on the official gager's certificate, or in case the barrels show evidence of loss by leakage or other shortages, the delivery shall be subject to

re-inspection and re-gaging by the Government inspector.

Notice. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

MILITARY INTERESTS:

Army—MU MR GL

Navy—Sh

Air Force—MAAMA

* U.S. GOVERNMENT PRINTING OFFICE: 1963—693804/250

Copies of this specification may be purchased for 5 cents each.

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Appendix L

WELL LOGS

Log of Well #1 --- Nellis Air Force Base, Las Vegas Nevada

0' to 25'	Ground Surface
25' to 120'	Sand, Gravel & Clay
120' to 140'	Clay, pink
140' to 170'	Clay, sandy layers
170' to 180'	Sand, Clay & Gravel
180' to 230'	Clay, sandy layers
230' to 240'	Clay, Sand & Gravel
240' to 250'	Clay, sandy layers
250' to 270'	Clay, Caliche & Gravel
270' to 370'	Clay, Sand & Gravel
370' to 390'	Sand, some Clay
390' to 410'	Sand, Clay & Gravel
410' to 420'	Sand, some Clay
420' to 440'	Sand, Clay & Gravel
440' to 530'	Clay, sandy streaks & Sand with streaks of Gravel
530' to 550'	Clay & Sand
550' to 570'	Sand, some Gravel
570' to 595'	Clay, light brown
595' to 620'	Sand, fine
620' to 690'	Sand, some Clay
690' to 700'	Clay, light brown
700' to 820'	Sand & Clay
820' to 970'	Sand, Clay & Gravel
970' to 985'	Sand & fine Gravel
985' to 1008'	Clay, Sand & Gravel
1008' to 1045'	Sand, some Gravel
1045' to 1075'	Sand, Gravel & Clay
1075' to 1090'	Clay, Sand & Gravel
1090' to 1103'	Sand, some Gravel
1103' to 1135'	Sand, fine
1135' to 1150'	Fine Sand, few Pebbles
1150' to 1165'	Fine Sand, some Clay
1165' to 1300'	Clay, dark gray
1300' to 1320'	Clay, streaks of Sand
1320' to 1502'	Fanglomerate Sandstone Gypsum Shale

27' of 28" x 1/4" Welded steel casing
456' of 14" x 1/4" solid casing
150' of 14" x 1/4" perforated casing
170' of 10" x 1/4" solid casing
400' of 10" x 1/4" perforated casing
Slot perforations 1 1/2" x 3/32", 2 1/2" apart.
Gravel packed between casing and outer well with a specially designed filler Gravel.
100% passing 3/8" and 1% passing No. 14 screen

Test Pumping Data
24 Hr. Test

Static Water Level 115' below G.S
225 GPM drawdown-139'
343 GPM drawdown 229'
443 GPM drawdown 259'

Log of Well #2 --- Nellis Air Force Base, Las Vegas Nevada

0' to 26'	Ground Surface
26' to 60'	Sand & Gravel
60' to 117'	Clay, pink
117' to 167'	Clay, Sand & Gravel
167' to 250'	Clay, streaks of Sand
250' to 415'	Sand & Clay
415' to 445'	Clay, Lt. Brown
445' to 650'	Clay, streaks of Sand
650' to 675'	Sand & Gravel
675' to 695'	Clay, Lt. Brown
695' to 805'	Sand & Clay
805' to 855'	Clay, Sand & Gravel
855' to 965'	Clay, streaks of Sand
965' to 975'	Sand, fine
975' to 985'	Clay, brown
985' to 1005'	Sand & Clay
1005' to 1075'	Clay, streaks of Sand & Gravel between 1005'-1025'
1075' to 1085'	Sand, fine
1085' to 1115'	Clay, some sand
1115' to 1135'	Sand, Clay & Gravel
1135' to 1165'	Clay, Sand & Gravel
1165' to 1175'	Clay, Lt. Brown
1175' to 1195'	Sand & Clay
1195' to 1215'	Sand, Lt. Brown-gray
1215' to 1225'	Clay, Lt. Brown-gray
1225' to 1245'	Sand & Clay
1245' to 1255'	Clay, Lt. Brown-gray
1255' to 1430'	Sand, cemented Gravel
1430' to 1435'	Clay, gray
1435' to 1450'	Clay, fine Sand
1450' to 1456'	Clay, dark gray

28' of 28" x 1/4" welded steel casing
456.5' of 14" x 1/4" solid casing
144' of 14" x 1/4" perforated casing
460' of 10" x 1/4" solid casing
400' of 10" x 1/4" perforated casing
Slot perforations 1 1/2" x 3/32", 2 1/2" apart.
Gravel packed between casing and outer well with a specially designed filter Gravel.
100% passing 3/8" and 1% passing No. 14 Screen

Test Pumping Data
24 Hr. Test

Static Water Level 130' below G. S.
113 GPM drawdown - 102'
150 GPM Drawdown - 186'
197 GPM drawdown - 278'
244 GPM drawdown - 358'

TABLE 2

Record of wells in Las Vegas and Indian Spring Valleys, Nevada. (Use of W... DI, Domestic and irrigation; Ind., Industrial; N, Unused; O, Observation; P,... lic supply; S. Stock.)

Well No. and Location	State Engineer's Local Field No.	State Permit No.	Owner	Driller	Year Completed	Diameter (inches at land surface)	Depth (feet)	Principal Aquifer (depth, feet)	Measuring Point: Above (+) or Below (—) Land Surface (feet)	Measuring Point: Description	Pressure Head or Water Level: Above (+) or Below (—) Measuring Point (feet)	Pressure Head or Water Level: Date of Measurement	Yield (gallons a minute): Flow	Use	Temperature (°F)	Remarks
INDIAN SPRING VALLEY																
(S-16-55) 11ad			Charles Kielhofer		.....	8	400	.....	.....	.....	.....	.....	5	DI,S		
(S-16-56) 2dd			Las Vegas Army Airfield—Indian Springs sub-base		1942	8	604	.....	.....	.....	.....	.....	.....	P	....	Analysis; 300 G. M. pumped in 1942.
(S-16-56) 5ab			Las Vegas Army Airfield—Indian Springs sub-base		1942	6	576	.....	0.0	Land surface	—54.0	9-15-1942	.....	P	....	Log; 185 G. M. pumped, drawdown 30 feet in 1942.
(S-16-56) 9da			S. C. Schenck		.....	60	25	.....	0.0	Top of 8-in. by 8-in. timber cribbing, east side	—23.79	3-18-1946	.....	N		
(S-16-56) 9ac			Unknown		.....	60	74	.....	+1.2	Top of 8-in. by 8-in. timber cribbing	—69.62	3-18-1946	.....	N		
(S-16-56) 9bb1			State of Nevada, Department of Highways		.....	60	35	.....	.....	.....	.....	.....	.....	DI		
(S-16-56) 9bb2			Tim Harnedy	Tim Harnedy and O. G. Hairgrove	.....	60	50	.....	+0.2	Top of concrete curb	—25.42	3-18-1946	.....	DI	....	Analysis; 5 G. M. pumped in 1946.
(S-16-56) 9bb3			Tim Harnedy	Tim Harnedy	.....	17	30	.....	+0.4	Top of concrete floor around well	—25.62	3-18-1946	.....	DI		
(S-16-56) 9bc1			Tim Harnedy	O. G. Hairgrove	.....	6	45	.....	+0.5	Top of casing	—13.52	3-18-1946	.....	DI		
(S-16-56) 9bc2			Tim Harnedy	O. G. Hairgrove	.....	8	582	.....	+0.2	Top of casing	—4.07	3-18-1946	.....	DI		
(S-16-56) 9bd			Mrs. R. Ridge		.....	60	22½	.....	+2.5	Top of 8-in. by 8-in. timber cribbing	—17.01	3-18-1946	.....	N		
(S-16-56) 16bc			Mrs. Alice MacFarland		.....	60	19½	.....	0.0	Top of 8-inch by 8-in. timber	—9.05	3-18-1946	.....	DI		
(S-16-56) 17a1			S. C. Schenck		.....	60	27	.....	0.0	Top of 8-in. by 8-in. timber	—22.37	3-18-1946	.....	DI		
(S-16-56) 17a2			S. C. Schenck		.....	60	25	.....	0.0	Top of board well cover	—21.79	3-18-1946	.....	N		
(S-16-56) 17a3			S. C. Schenck		.....	60	16½	.....	0.0	Top of 8-in. by 8-in. timber cribbing	—15.12	3-18-1946	.....	N		

TABLE 3

Logs and Casing Records of Wells in Las Vegas and Indian Spring Valleys, Nevada

INDIAN SPRING VALLEY

(S–16–56)8ab. Las Vegas Army Airfield—Indian Springs, sub-base. Land surface altitude 3,132 feet; diameter 6 inches: 6-inch casing to 322 feet. Driller's log.

Material	Thickness (feet)	Depth (feet)
Soil	1	1
Cemented gravel	19	20
"Loose" gravel	4	24
Cemented gravel	16	40
Broken rock and gravel	20	60
Cemented rock and sand	24	84
Cemented gravel	18	102
Cemented rock and gravel	42	144
Cemented gravel	8	152
Cemented rock and gravel	20	172
Cemented rock	22	194
Cemented gravel	50	244
Clay and gravel	4	248
Cemented gravel	22	270
Sand and gravel	34	304
Clay	2	306
Cemented gravel	4	310
"Limerock and shale"	266	576
Total depth	....	576

LAS VEGAS VALLEY

(S–19–60) 4dab1. P. J. Goumond. Diameter 18 inches, 18-inch casing to 200 feet, 16-inch casing from 143 to 780 feet, perforated 311 to 606 feet with 4 slots every 18 inches.

Material	Thickness (feet)	Depth (feet)
Light tan clay	10	10
Dark and medium tan clay	70	80
Light greenish tan clay	10	90
Dark and medium tan clay, water level 210 feet below surface	210	300
Pebble and granule-gravel, water level 13 feet below surface	10	310
Granules and coarse sand (Underlain by thin layer greenish clay)	10	320
Light tan clay with few pebbles, water flowing at surface	32	352
Light green clay with few small pebbles	8	360
Light tan clay some caliche pebbles or nodules	40	400
Light green clay with some light tan clay layers	30	430
Light and medium tan clay	30	460
Very light tan clay, nodular with some caliche	6	466
White marly clay nodules with little light tan clay	4	470
Medium tan clay	40	510
Medium tan clay with some medium sand and pebbles	5	515
Light tan clay, few pebbles	45	560
Pebble gravel, little sand, few clay balls	6	566
Fine sand, few pebbles and granules, water	4	570
Clay with few granules and little fine sand	22	592
Fine and medium grained sand, water	8	600
Coarse sand and granules with some medium and fine sand, little clay, water	10	610
Light to medium tan clay	170	780
Total depth	....	780

Appendix M
WATER QUALITY DATA

Nellis Air Force Base
Las Vegas, Nevada

Analyses by Geological Survey, United States Department of the Interior
(parts per million) - On base wells

Salt Lake City Laboratory Number	13674	13675	13676	13677		
Date of collection	11/29/54	11/28/54	11/28/54	11/29/54		
Silica (SiO_2)	26	16	20	32		
Iron (Fe), dissolved 1/	.03	.05	.02	.04		
Iron (Fe), total	.04	—	.07	—		
Manganese (Mn), dissolved 1/	—	—	—	.00		
Manganese (Mn), total	.00	.00	.00	—		
Calcium (Ca)	36	46	44	36		
Magnesium (Mg)	28	26	26	25		
Sodium (Na)	16	6.2	7.0	66		
Potassium (K)	3.3	1.2	1.7	6.6		
Bicarbonate (HCO_3)	252	232	234	242		
Carbonate (CO_3)	0	0	0	0		
Sulfate (SO_4)	27	33	32	119		
Chloride (Cl)	6.8	5.5	4.8	14		
Fluoride (F)	.5	.2	.2	.8		
Nitrate (NO_3)	1.9	1.2	1.6	1.1		
Dissolved solids						
Sum	270	243	252	420		
Residue on evaporation at 180°C	263	243	246	426		
Hardness as $CaCO_3$	205	222	217	193		
Non-carbonate	0	32	25	0		
Specific conductance (micromhos at 25°C)	440	416	411	640		
pH	7.7	7.7	7.6	7.7		
Color	5	5	5	5		

1/ In solution at time of analysis.

13674 - Drilled Well. SW1/4 sec.4 T20S R61E. Depth: 790'. Diam: 16". Pt.coll: casing head. WSF: gravel 90' to 790'. WL: 113'. Yield: 260 GM pump. Temp: 71° F. Use: Dom. Irr. Appr clear. No. 1.

13675 - Drilled Well. SW1/4 sec. 3 T20S R61E. Depth: 300'. Diam: 20". Pt.coll: casing head. WSF: gravel 248 to 300'. WL: 46'. Yield: 420 GM. Temp: 76° F. Use: Dom. Irr. Appr clear. No. 2.

13676 - Drilled Well. SW1/4 sec. 3 T20S R61E. Depth: 504'. Diam: 12". Pt.coll: casing head. WSF: gravel from 248 to 500'. WL: 55'. Yield: 200 gm. Temp: 72° F. Use: Dom. Irr. Appr clear. No. 4.

13677 - Drilled Well. SW1/4 sec.9 T20S R62E. Depth: 1000'. Diam: 16". Pt.coll: casing head. WSF: sand and clay (?) from 90 to 1000'. WL: 125'. Yield: 410 GM pump mess. Temp: 77° F. Use: Irr. Dom. Appr clear. No. 6.

Collected by: Donald C. Urquhart.

Wells AFB
Las Vegas, Nev.

Analyses by Geological Survey, United States Department of the Interior
(parts per million) - On base wells

Salt Lake City Laboratory Number	13678	13679	13680
Date of collection	11/29/54	11/27/54	11/27/54
Silica (SiO_2)	40	35	7.5
Iron (Fe), dissolved 1/	.12	.04	.02
Iron (Fe), total	.35	.05	.03
Manganese (Mn), dissolved 1/	—	—	—
Manganese (Mn), total	.00	.00	.00
Calcium (Ca)	28	40	72
Magnesium (Mg)	17	28	30
Sodium (Na)	15	34	.9
Potassium (K)	3.0	4.3	.3
Bicarbonate (HCO_3)	270	245	346
Carbonate (CO_3)	0	0	0
Sulfate (SO_4)	26	70	10
Chloride (Cl)	4.5	8.8	1.8
Fluoride (F)	.5	.5	.1
Nitrate (NO_3)	1.5	1.1	.6
Dissolved solids			
Sum	289	343	293
Residue on evaporation at 180°C	282	336	291
Hardness as $CaCO_3$	222	215	303
Non-carbonate	1	14	20
Specific conductance (micromhos at 25°C)	449	524	514
pH	7.7	7.7	7.8
Color	5	5	5

1/In solution at time of analysis.

13678 - Drilled Well. SW1/4 sec.9 T20S R62E. Depth: 1000'. Diam: 16". Pt.coll: casing head. WSF: sand & clay (?) from 90 to 1000'. Wl: 135'. Yield: 250 GM pump meas. Temp: 71° F. Use: Dom. Irr. Appr: clear. No. 7

13679 - Sewage Plant. Pt.coll: tap. Temp: 70° F. Use: Dom. Irr. Appr: clear.

13680 - Spring. 1/4 sec. 20 T19S R57 E. Pt.coll: spring. Temp: 50° F. Use: Dom. Irr. Appr: clear.

Collected by: Donald G. Urquhart.

38687-89 GP810188

SAMPLE COLLECTION INFORMATION

7. SITE DESCRIPTION: Area II

8. SITE LOCATION NO: Well # 4

9. FLOWRATE AT SITE 00058 GAL/MIN:

10. WEATHER 00041:

11. COLLECTION DATE/PERIOD: 17 Sep 81

12. NAME OF COLLECTOR: SSgt Hutchinson

13. SAMPLING TECHNIQUE:

14. PHONE NUMBER: 2828

15. REASON FOR SAMPLE SUBMISSION:

5. DATE RECEIVED BY LAB: 22 Sept. 81

6. DATE ANALYSIS COMPLETED: 28 Oct. 81

ON-SITE ANALYTICAL RESULTS

16. WATER TEMP 00010 °C:

17. PH 00400 UNITS:

18. DISS O_2 00300 MG/L:

19. RESULTS OF OTHER ON-SITE ANALYSES:

ANALYSES REQUESTED AND RESULTS

A. PRIMARY DRINKING WATER STANDARDS (40CFR 141)

88 PRESERVATION GROUP F (295)

PARAMETER	TOTAL	µG/L	MAX LEV ALLWD
ARSENIC	01002	108.	50 µG/L
BARIUM	01007	<1000.	1000 µG/L
CADMIUM	01027	<10.	10. µG/L
CHROMIUM	01034	<50.	50 µG/L
LEAD	01051	<20.	50 µG/L
MERCURY	71900	<2.	2 µG/L
SELENIUM	01147	<10.	10 µG/L
SILVER	01077	<10.	50 µG/L

87 PRESERVATION GROUP (28)

PARAMETER	TOTAL	MG/L	MAX LEV ALLWD
NITRATE AS N (Cadmium Reduction Method)	00620	0,8	10 MG/L

89 PRESERVATION GROUP G

PARAMETER	TOTAL	MG/L	MAX LEV ALLWD
FLUORIDE	71052	2.8	See table in APR 141-44
TURBIDITY	100076	<1 Units	1 Unit

B. OTHER ANALYSES

PRESERVATION GROUP F

PARAMETER	TOTAL	µG/L
COPPER	01042	
IRON	01045	
MANGANESE	01055	
ZINC	01092	
CALCIUM As Ca	00916	44.5 mg/l
MAGNESIUM as Mg	00927	20.7 mg/l
POTASSIUM	00937	9.2 mg/l
SODIUM	00929	85.2 mg/l

PRESERVATION GROUP G (275)

PARAMETER	TOTAL	MG/L
Acidity, Mineral As $CaCO_3$	00436	
Acidity, Total, As $CaCO_3$	00435	
Alkalin, Phenolth As $CaCO_3$	00415	152
Alkalinity, Total, As $CaCO_3$	00410	
Chloride	00940	
Hardness As $CaCO_3$	00900	
Residue, Filtrable (TDS)	00515	
Residue, Non-Filtrable (SS)	00530	
Residue	00500	
Specific Conductance	00095	µmhos

PARAMETER	TOTAL	MG/L
Sulfate As SO_4	00945	
Surfactants MBAS As LAS	38260	
CO_2		*
Silica		43.0

PRESERVATION GROUP J

PARAMETER		

1. ORGANIZATION REQUESTING ANALYSIS:

* To calculate Free CO_2, we must have the results of on site analyses for pH and water temperature.

CHEMIST:

REVIEWED BY:

APPROVED BY:

CEHL FORM NOV 76 2

☆ U. S. GOVERNMENT PRINTING OFFICE: 1979—672-390

POTABLE WATER ANALYSIS

M-2

Water Resources Division
Rm. W-2235 Federal Building
2800 Cottage Way
Sacramento, Calif. 95825

Nellis Air Force Base

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Analyses by Geological Survey, United States Department of the Interior
(parts per million)

9-268 q

UNPUBLISHED RECORDS SUBJECT TO REVISION — Lab. No.	Indian Springs, Dist. 62220	Well 2 Area 2 62221	Area 2 Dist. 62222	Well #1 Area 2 62223		
Date of collection 1971	12-28	12-28	12-28	12-28		
Collected by: Powell						
Silica (SiO_2)	16.	17.	4.7	17.		
Iron (Fe) Total	0.02	0.03	0.00	0.05		
Manganese (Mn)						
Calcium (Ca)	70.	71.	8.0	70.		
Magnesium (Mg)	39.	39.	18.	38.		
Sodium (Na)	21.	21.	11.	21.		
Potassium (K)	3.1	3.1	1.7	3.1		
Bicarbonate (HCO_3)	227	228	14	229		
Carbonate (CO_3)	0	0	0	0		
Sulfate (SO_4)	138	144	74.	144		
Chloride (Cl)	40.	43.	20.	36.		
Fluoride (F)	0.5	0.4	0.2	0.4		
Nitrate (NO_3)	12.	11.	5.1	11.		
Dissolved solids						
Calculated	452	462	150	454		
Residue on evaporation at 180°C	508	506	173	510		
Hardness as $CaCO_3$	335	338	94	331		
Noncarbonate hardness as $CaCO_3$	149	151	83	143		
Alkalinity as $CaCO_3$	186	187	11	188		
Specific conductance (micromhos at 25°C)	750	760	285	753		
pH	7.9	7.8	6.6	7.7		
Color	12	12	20	12		

Nellis Air Force Base, Nevada

MAJOR INSTALLATION: Tactical Air Command

Analyst: Charles F. Berkstresser, Jr. 2-18-71 klj

See tops of lab sheets for field information (attached)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CENTRAL LABORATORY DENVER, COLORADO

WATER QUALITY ANALYSIS
LAB-ID # 1300039 RECORD-# 91644

1ST RETRIEVAL THROUGH "LABPWIN" 12/08/81

SAMPLE LOCATION: SUNRISE MINE - SOUTH OF OASE
STATION ID: 361204115024901 LAT.LONG.SEQ.: 361204 1150249 01
DATE OF COLLECTION: BEGIN--811021 END-- TIME--1620
STATE CODE: 32 COUNTY CODE: 005 PROJECT IDENTIFICATION: 479208180
DATA TYPE: 2 SOURCE: GROUND WATER GEOLOGIC UNIT:
COMMENTS: UNIQUE-01

MAIL TO NEVADA
SCHEDULES USED: 1029 1032 0 0
TOTAL PARAMETERS: 28 MCODE = 16
COST OF ANALYSIS $ 79.65 BILLING CODE: 32
SUBMIT CORRECTIONS TO THE DENVER CENLAB LAB WITHIN 15 DAYS FROM 12/08/81. INDICATE THE CENTRAL LAB ID # AND RECORD # WITH RESPONSE.
MRD-ON FILE STORAGE WAS REQUESTED AND THE STATION HEADING INFORMATION IN THE MRD STATION HEADER FILE WAS SUBSTITUTED HERE. PLEASE CHECK.

ALK TOT LAB, CACO3	MG/L	130	NITR, DIS NH4 AS NH4	MG/L	0.14
ANALYZING AGENCY		80020	PH (LABORATORY)	UNITS	7.7
CALCIUM, DISSOLV.	MG/L	210	PHOSPHORUS, DIS.	MG/L	0.03
CHLORIDE, DISSOLVED	MG/L	290	POTASSIUM, DISSOLVED	MG/L	9.7
DEPTH LOC VERT IN FT		93.5	RESIDUE DIS CALC SUM	MG/L	2290
FLUORIDE, DISSOLVED	MG/L	0.8	RESIDUE, DISS. AT 180 C	MG/L	2480
HARDNESS	MG/L	1700	SILICA, DIS.	MG/L	67
HARDNESS N.CARB L-EP	MG/L	1500	SODIUM, ABSORP RATIO		0.8
MAGNESIUM, DISSOLV.	MG/L	280	SODIUM, DIS.	MG/L	75
NITR DIS NO2+NO3 --	MG/L	18.0	SODIUM, PERCENT	%	9
NITR DISS NH4 AS	MG/L	0.18	SP. CONDUCTANCE FLD	UMHOS	3035
NITR DISS NH4+ORG-N	MG/L	1.8	SP. CONDUCTANCE LAB	UMHOS	2500
NITR DISS ORG AS	MG/L	1.7	SULFATE, DISSOLVED	MG/L	1200
NITR DISSOLVED AS	MG/L	20	WATER TEMPERATURE	DEG C	21.0

CATIONS	(MG/L)	(MEQ/L)	ANIONS	(MG/L)	(MEQ/L)
CALCIUM, DISSO	210	10.479	CHLORIDE, DISS	290	8.181
MAGNESIUM, DIS	280	23.033	FLUORIDE, DISS	0.8	0.042
POTASSIUM, DIS	9.7	0.248	SULFATE, DISSO	1200	24.986
SODIUM, DIS.	75	3.263	ALK TOT LAB.	130	2.597
			NITR DIS NO2+N	18	1.285
TOTAL		37.022	TOTAL		37.089

PERCENT DIFFERENCE = -0.09

M-5

Appendix N
FEDERAL AND STATE SPECIES DESIGNATIONS

Appendix N

FEDERAL AND STATE SPECIES DESIGNATIONS

DEFINITIONS OF FEDERAL DESIGNATIONS

E = Endangered Species in danger of extinction throughout all or a significant portion of its range.[1]

T = Threatened Species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.[1]

C = Candidate Species being considered for listing as Endangered or Threatened under the Endangered Species Act of 1973, as amended.[2]

---

[1]Endangered Species Act of 1973, PL 93-205 (87 Stat. 884). Reprint December 1978. U.S. Dept. of Interior, Fish and Wildlife Service.

[2]Endangered and Threatened Wildlife and Plants Review of Plant Taxa for Listing as Endangered or Threatened Species. 50 CFR Part 17, F.R. Vol. 45, No. 242. 12/15/80.

DEFINITION OF NEVADA DESIGNATIONS

E = Endangered Species or subspecies in danger of extinction throughout all or a significant portion of its range.

R = Rare Species or subspecies is rare although not presently threatened with extinction if it exists in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment deteriorates.

P = Protected All species not falling into the category of not protected.

Source: NAC Code 503.010. July 1, 1970.

INSTALLATION RESTORATION PROGRAM RECORDS SEARCH

HAZARD ASSESSMENT RATING METHODOLOGY FOR NELLIS AIR FORCE BASE, NEVADA

Prepared for

Air Force Engineering and Services Center
Directorate of Environmental Planning
Tyndall Air Force Base, Florida 32403

Prepared by

CH2M HILL
P.O. Box 1647
Gainesville, Florida 32602

June 1982
Contract No. FO863780 G0010 0015

Appendix O
NEW HAZARDOUS ASSESSMENT RATING METHODOLOGY

USAF INSTALLATION RESTORATION PROGRAM
HAZARD ASSESSMENT RATING METHODOLOGY

BACKGROUND

The Department of Defense (DOD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DOD facilities. One of the actions required under this program is to:

> "develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts." (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Records Search phase of its Installation Restoration Program (IRP).

The first site rating model was developed in June 1981 at a meeting with representatives from USAF Occupational Environmental Health Laboratory (OEHL), Air Force Engineering Services Center (AFESC), Engineering-Science (ES) and CH_2M Hill. The basis for this model was a system developed for EPA by JRB Associates of McLean, Virginia. The JRB model was modified to meet Air Force needs.

After using this model for 6 months at over 20 Air Force installations, certain inadequacies became apparent. Therefore, on January 26 and 27, 1982, representatives of USAF OEHL, AFESC, various major commands, Engineering Science, and CH_2M Hill met to address the inadequacies. The result of the meeting was a new site rating model designed to present a better picture of the hazards posed by sites at Air Force installations. The new rating model described in this presentation is referred to as the Hazard Assessment Rating Methodology.

PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air Force in setting priorities for follow-on site investigations and confirmation work under Phase II of IRP.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DOD program needs.

The model uses data readily obtained during the Record Search portion (Phase I) of the IRP. Scoring judgments and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards at the site. This approach meshes well with the policy for evaluating and setting restrictions on excess DOD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1). The site rating form is provided in Figure 2 and the rating factor guidelines are provided in Table 1.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: the possible receptors of the contamination the waste and its characteristics, potential pathways for waste contaminant migration, and any efforts to contain the contaminants. Each of these categories contains a number of rating factors that are used in the overall hazard rating.

The receptors category rating is calculated by scoring each factor, multiplying by a factor weighting constant and adding the weighted scores to obtain a total category score.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned and for direct evidence 100 points are assigned. If no evidence is found, the highest score among three possible routes is used. These routes are surface water migration, flooding, and ground-water migration. Evaluation of each route involves factors associated with the particular migration route. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The waste characteristics category is scored in three steps. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The scores for each of the three categories are then added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Sites at which there is no containment are not reduced in score. Scores for sites with limited containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste managment practices category factor to the sum of the scores for the other three categories.

SITE RATING METHODOLOGY FLOW CHART

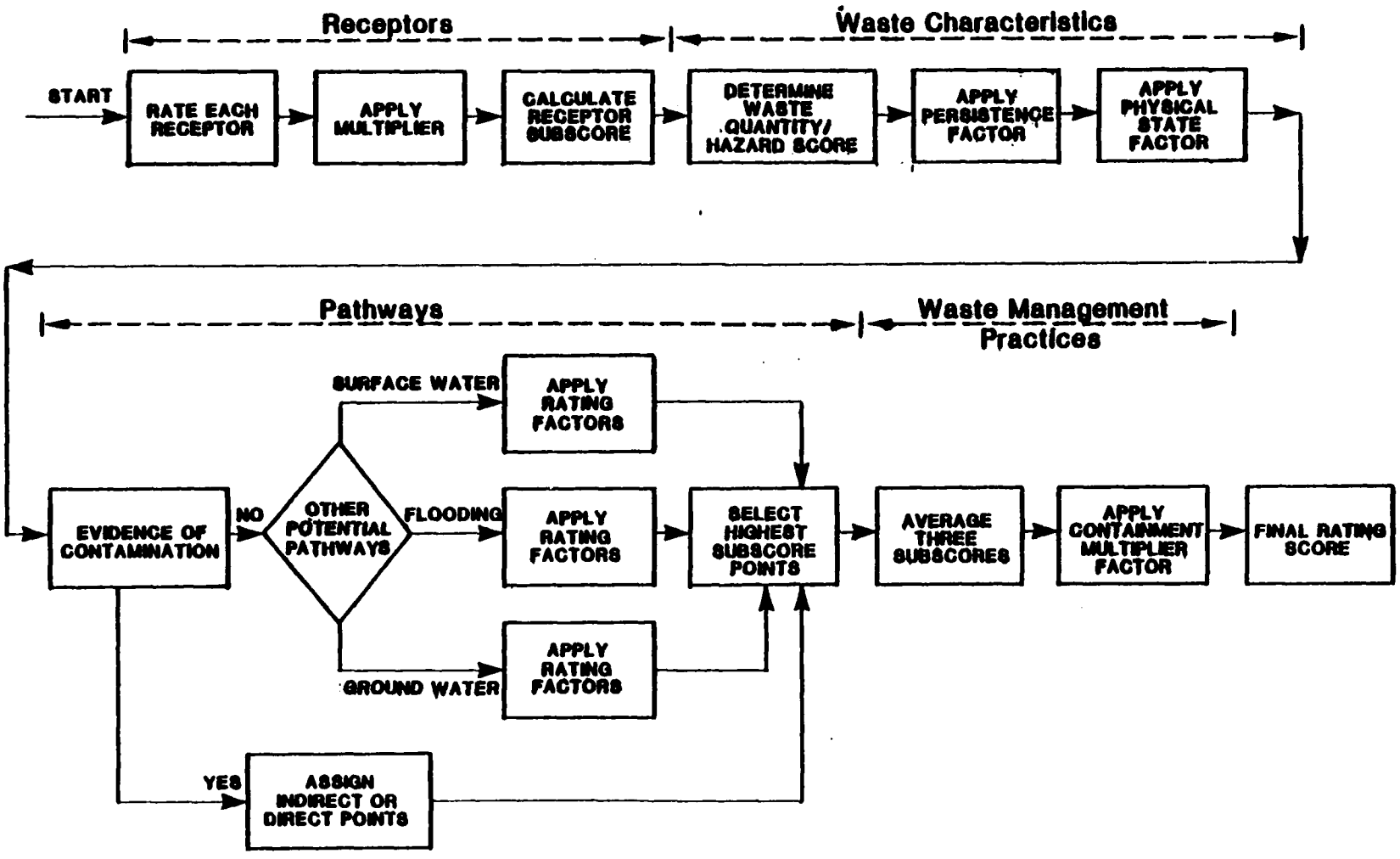

FIGURE 1

FIGURE 2

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE _____

LOCATION _____

DATE OF OPERATION OR OCCURRENCE _____

OWNER/OPERATOR _____

COMMENTS/DESCRIPTION _____

SITE RATED BY _____

I. RECEPTORS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. Population within 1,000 feet of site		4		
B. Distance to nearest well		10		
C. Land use/zoning within 1 mile radius		3		
D. Distance to reservation boundary		6		
E. Critical environments within 1 mile radius of site		10		
F. Water quality of nearest surface water body		6		
G. Ground water use of uppermost aquifer		9		
H. Population served by surface water supply within 3 miles downstream of site		6		
I. Population served by ground-water supply within 3 miles of site		6		
		Subtotals	_____	_____

Receptors subscore (100 X factor score subtotal/maximum score subtotal) _____

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) _____
2. Confidence level (C = confirmed, S = suspected) _____
3. Hazard rating (H = high, M = medium, L = low) _____

Factor Subscore A (from 20 to 100 based on factor score matrix) _____

B. Apply persistence factor
Factor Subscore A X Persistence Factor = Subscore B

_____ X _____ = _____

C. Apply physical state multiplier

Subscore B X Physical State Multiplier = Waste Characteristics Subscore

_____ X _____ = _____

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score

A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.

Subscore _____

B. Rate the migration potential for 3 potential pathways: surface water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.

1. Surface water migration

Distance to nearest surface water		8		
Net precipitation		6		
Surface erosion		8		
Surface permeability		6		
Rainfall intensity		8		
		Subtotals	_____	_____

Subscore (100 X factor score subtotal/maximum score subtotal) _____

2. Flooding

Flooding		1		

Subscore (100 x factor score/3) _____

3. Ground-water migration

Depth to ground water		8		
Net precipitation		6		
Soil permeability		8		
Subsurface flows		8		
Direct access to ground water		8		
		Subtotals	_____	_____

Subscore (100 x factor score subtotal/maximum score subtotal) _____

C. Highest pathway subscore.

Enter the highest subscore value from A, B-1, B-2 or B-3 above.

Pathways Subscore _____

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors _____
Waste Characteristics _____
Pathways _____

Total _____ divided by 3 = _____
Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score X Waste Management Practices Factor = Final Score

_____ X _____ = [ ]

TABLE 1

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES

I. RECEPTORS CATEGORY

Rating Factors	Rating Scale Levels				Multiplier
	0	1	2	3	
A. Population within 1,000 feet (includes on-base facilities)	0	1 - 25	26 - 100	Greater than 100	4
B. Distance to nearest water well	Greater than 3 miles	1 to 3 miles	3,001 feet to 1 mile	0 to 3,000 feet	10
C. Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 feet	3
D. Land Use/Zoning (within 1 mile radius)	Completely remote (zoning not applicable)	Agricultural	Commercial or industrial	Residential	6
E. Critical environments (within 1 mile radius)	Not a critical environment	Natural areas	Pristine natural areas; minor wetlands; preserved areas; presence of economically important natural resources susceptible to contamination.	Major habitat of an endangered or threatened species; presence of recharge area; major wetlands.	10
F. Water quality/use designation of nearest surface water body	Agricultural or industrial use.	Recreation, propagation and management of fish and wildlife.	Shellfish propagation and harvesting.	Potable water supplies	6
G. Ground-Water use of uppermost aquifer	Not used, other sources readily available.	Commercial, industrial, or irrigation, very limited other water sources.	Drinking water, municipal water available.	Drinking water, no municipal water available; commercial, industrial, or irrigation, no other water source available.	9
H. Population served by surface water supplies within 3 miles downstream of site	0	1 - 50	51 - 1,000	Greater than 1,000	6
I. Population served by aquifer supplies within 3 miles of site	0	1 - 50	51 - 1,000	Greater than 1, 000	6

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

II. WASTE CHARACTERISTICS

A-1 Hazardous Waste Quantity

S = Small quantity (5 tons or 20 drums of liquid)
M = Moderate quantity (5 to 20 tons or 21 to 85 drums of liquid)
L = Large quantity (20 tons or 85 drums of liquid)

A-2 Confidence Level of Information

C = Confirmed confidence level (minimum criteria below)

- o Verbal reports from interviewer (at least 2) or written information from the records.
- o Knowledge of types and quantities of wastes generated by shops and other areas on base.
- o Based on the above, a determination of the types and quantities of waste disposed of at the site.

S = Suspected confidence level

- o No verbal reports or conflicting verbal reports and no written information from the records.
- o Logic based on a knowledge of the types and quantities of hazardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site.

A-3 Hazard Rating

Hazard Category	Rating Scale Levels			
	0	1	2	3
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Level 2	Sax's Level 3
Ignitability	Flash point greater than 200°F	Flash point at 140°F to 200°F	Flash point at 80°F to 140°F	Flash point less than 80°F
Radioactivity	At or below background levels	1 to 3 times background levels	3 to 5 times background levels	Over 5 times background levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and determine the hazard rating.

Hazard Rating	Points
High (H)	3
Medium (M)	2
Low (L)	1

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

II. WASTE CHARACTERISTICS (Continued)

Waste Characteristics Matrix

Point Rating	Hazardous Waste Quantity	Confidence Level of Information	Hazard Rating
100	L	C	H
80	L	C	H
	H	C	H
70	L	S	H
60	S	C	H
	H	C	H
50	L	S	H
	L	C	L
	H	S	H
	S	C	H
40	S	S	H
	H	S	H
	H	C	L
	L	S	L
30	S	C	L
	H	S	L
	S	S	H
20	S	S	L

Notes:
For a site with more than one hazardous waste, the waste quantities may be added using the following rules:
Confidence Level
- Confirmed confidence levels (C) can be added
- Suspected confidence levels (S) can be added
- Confirmed confidence levels cannot be added with suspected confidence levels

Waste Hazard Rating
- Wastes with the same hazard rating can be added
- Wastes with different hazard ratings can only be added in a downgrade mode, e.g., HCH + SCH = LCH if the total quantity is greater than 20 tons.

Example: Several wastes may be present at a site, each having an HCH designation (60 points). By adding the quantities of each waste, the designation may change to LCH (40 points). In this case, the correct point rating for the waste is 80.

B. Persistence Multiplier for Point Rating

Persistence Criteria	Multiply Point Rating From Part A by the Following
Metals, polycyclic compounds, and halogenated hydrocarbons	1.0
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.8
Easily biodegradable compounds	0.4

C. Physical State Multiplier

Physical State	Multiply Point Total From Parts A and B by the Following
Liquid	1.0
Sludge	0.75
Solid	0.50

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

III. PATHWAYS CATEGORY

A. Evidence of Contamination

Direct evidence is obtained from laboratory analyses of hazardous contaminants present above natural background levels in surface water, ground water, or air. Evidence should confirm that the source of contamination is the site being evaluated.

Indirect evidence might be from visual observation (i.e., leachate), vegetation stress, sludge deposits, presence of taste and odors in drinking water, or reported discharges that cannot be directly confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

B-1 POTENTIAL FOR SURFACE WATER CONTAMINATION

Rating Factor	Rating Scale Levels 0	1	2	3	Multiplier
Distance to nearest surface water (includes drainage ditches and storm sewers)	Greater than 1 mile	2,001 feet to 1 mile	501 feet to 2,000 feet	0 to 500 feet	8
Net precipitation	Less than -10 in.	-10 to + 5 in.	+5 to +20 in.	Greater than +20 in.	6
Surface erosion	None	Slight	Moderate	Severe	8
Surface permeability	0% to 15% clay ($>10^{-2}$ cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	Greater than 50% clay ($<10^{-6}$ cm/sec)	6
Rainfall intensity based on 1 year 24-hr rainfall	<1.0 inch	1.0-2.0 inches	2.1-3.0 inches	>3.0 inches	8
B-2 POTENTIAL FOR FLOODING					
Floodplain	Beyond 100-year floodplain	In 25-year floodplain	In 10-year floodplain	Floods annually	1
B-3 POTENTIAL FOR GROUND-WATER CONTAMINATION					
Depth to ground water	Greater than 500 ft	50 to 500 feet	11 to 50 feet	0 to 10 feet	8
Net precipitation	Less than -10 in.	-10 to +5 in.	+5 to +20 in.	Greater than +20 in.	6
Soil permeability	Greater than 50% clay ($>10^{-6}$ cm/sec)	30% to 50% clay (10^{-4} to 10^{-6} cm/sec)	15% to 30% clay (10^{-2} to 10^{-4} cm/sec)	0% to 15% clay ($<10^{-2}$ cm/sec)	8
Subsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally submerged	Bottom of site frequently submerged	Bottom of site located below mean ground-water level	8
Direct access to ground water (through faults, fractures, faulty well casings, subsidence fissures,	No evidence of risk	Low risk	Moderate risk	High risk	8

TABLE 1 (Continued)

HAZARDOUS ASSESSMENT RATING METHODOLOGY GUIDELINES (Cont'd)

IV. WASTE MANAGEMENT PRACTICES CATEGORY

A. This category adjusts the total risk as determined from the receptors, pathways, and waste characteristics categories for waste management practices and engineering controls designed to reduce this risk. The total risk is determined by first averaging the receptors, pathways, and waste characteristics subscores.

B. WASTE MANAGEMENT PRACTICES FACTOR

The following multipliers are then applied to the total risk points (from A):

Waste Management Practice	Multiplier
No containment	1.0
Limited containment	0.95
Fully contained and in full compliance	0.10

Guidelines for fully contained:

Landfills:

- o Clay cap or other impermeable cover
- o Leachate collection system
- o Liners in good condition
- o Adequate monitoring wells

Surface Impoundments:

- o Liners in good condition
- o Sound dikes and adequate freeboard
- o Adequate monitoring wells

Spills:

- o Quick spill cleanup action taken
- o Contaminated soil removed
- o Soil and/or water samples confirm total cleanup of the spill

Fire Proection Training Areas:

- o Concrete surface and berms
- o Oil/water separator for pretreatment of runoff
- o Effluent from oil/water separator to treatment plant

General Note: If data are not available or known to be complete the factor ratings under items I-A through I, III-B-1 or III-B-3, then leave blank for calculation of factor score and maximum possible score.

Appendix P
NEW SITE RATING FORMS

Table 1
SUMMARY OF RESULTS OF SITE ASSESSMENTS

Site No.	Site Description	Subscores (% of Maximum Possible Score in Each Category) Receptors	Pathways	Waste Characteristics	Overall Score (Sum of Subscores/3)
Main Base					
1	Base Landfill	63	56	80	66
2	Base Landfill	49	28	40	39
3	Base Landfill	41	28	40	36
15	Storm Drain Gully	62	56	60	59
17	STP Percolation Ponds	63	80	50	64
18	Abandoned Fire Department Training Area	54	21	50	42
19	Abandoned Fire Department Training Area	54	21	50	42
20	Existing Fire Department Training Area	52	26	80	53
23	Leach Field	54	21	30	35
24	Fuel Tank Sludge Burial	59	80	38	59
27	Leaking Waste POL Tank	54	21	50	42
28	Fuel Spill	53	21	48	41
Small Arms Range					
1	Base Landfill	34	28	40	34
2	Base Landfill	34	28	40	34
6	Radioactive Waste Pits	34	28	30	31
Indian Springs AFAF					
1	Field Landfill	41	21	40	34
5	Fire Department Training Area	57	21	40	39

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 1, Base Landfill

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Industrial, domestic

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	114	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 63

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	3	8	24	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		56

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	63
Waste Characteristics	80
Pathways	56
Total 199 divided by 3 =	66
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

66 x 1.0 = 66

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2, Base Landfill

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Industrial, domestic demolition

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	89	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 49

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	20	108
Subscore (100 x factor score subtotal/maximum score subtotal)				19
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	49
Waste Characteristics	40
Pathways	28
Total 117 divided by 3 =	39
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

39 x 1.0 = 39

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 3, Base Landfill

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Industrial, domestic

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	73	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 41

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--[1]
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	20	108
Subscore (100 x factor score subtotal/maximum score subtotal)				19
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	41
Waste Characteristics	40
Pathways	28
Total 109 divided by 3 =	36
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

1.0 x 36 = 36

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 15, Storm Drain Gully

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Flight line runoff, oil, solvents

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	111	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 62

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x 1.0 = 60

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

60 x 1.0 = 60

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	3	8	24	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		56

IV. WASTE MANAGEMENT PRACTICES

A. *Average the three subscores for receptors, waste characteristics, and pathways.*

Receptors	62
Waste Characteristics	60
Pathways	56
Total 178 divided by 3 =	59
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

1.0 x 59 = 59

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 17, STP Percolation Ponds

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Sanitary and shop industrial wastes

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	114	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 63

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	3	8	24	24
Net precipitation	0	6	0	18
Surface erosion	3	8	24	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	60	108
Subscore (100 x factor score subtotal/maximum score subtotal)				56
2. Flooding	30	1	30	100
		Subscore (100 x factor score/3)		30
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	63
Waste Characteristics	50
Pathways	80
Total 193 divided by 3 =	64
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

64 x 1.0 = 64

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 18, Abandoned Fire Training

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: POL, solvent burning

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	98	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	-'
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	9	0	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	12	108
Subscore (100 x factor score subtotal/maximum score subtotal)				11
2. Flooding	--	1	--	--
		Subscore (100 x factor score/3)		--
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		21

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	50
Pathways	21
Total 125 divided by 3 =	42
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

42 x 1.0 = 42

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 19, Abandoned Fire Training

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: POL, solvent burning

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	98	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	12	108
Subscore (100 x factor score subtotal/maximum score subtotal)				11
2. Flooding	--	1	--	--
		Subscore (100 x factor score/3)		--
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		21

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	50
Pathways	21
Total 125 divided by 3 =	42
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

42 x 1.0 = 42

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 20, Existing Fire Training

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: POL, solvent burning

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	2	4	8	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	1	3	3	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	94	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 52

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) L

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 80

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

80 x 1.0 = 80

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

80 x 1.0 = 80

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	-'
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	1	8	8	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	28	108
Subscore (100 x factor score subtotal/maximum score subtotal)				26
2. *Flooding*	0	1	--	--
		Subscore (100 x factor score/3)		--
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				22
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		26

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	52
Waste Characteristics	80
Pathways	26
Total 158 divided by 3 =	53
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

53 x 1.0 = 53

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 23, Leach Field

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: POL, sanitary

SITE RATED BY: Michael Kemp

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	97	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

30 x 1.0 = 30

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

30 x 1.0 = 30

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	1	6	6	18
Rainfall intensity	0	8	0	24
		Subtotals	6	108
Subscore (100 x factor score subtotal/maximum score subtotal)				6
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		21

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	30
Pathways	21
Total 105 divided by 3 =	35
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

35 x 1.0 = 35

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 24, Fuel Tank Sludge Burial

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: JP-4, Leaded fuel sludge

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	3	3	9	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	106	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 59

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) H

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x .75 = 38

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	80
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	12	108
Subscore (100 x factor score subtotal/maximum score subtotal)				11
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	80

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	59
Waste Characteristics	38
Pathways	80
Total 177 divided by 3 =	59
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

59 x 1.0 = 59

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 27, Waste POL Tank Leak

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Waste POL

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	97	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 54

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) C
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 50

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

50 x 1.0 = 50

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

50 x 1.0 = 50

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	12	108
Subscore (100 x factor score subtotal/maximum score subtotal)				11
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		21

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	54
Waste Characteristics	50
Pathways	21
Total 125 divided by 3 =	42
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

42 x 1.0 = 42

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 28, Fuel Spill

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: JP-4

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	3	4	12	12
B.	Distance to nearest well	2	10	20	30
C.	Land use/zoning within 1 mile radius	2	3	6	9
D.	Distance to reservation boundary	2	6	12	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	95	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 53

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) C

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 60

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

60 x .8 = 48

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

48 x 1.0 = 48

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	0	8	0	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	12	108
Subscore (100 x factor score subtotal/maximum score subtotal)				11
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	0
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		21

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	53
Waste Characteristics	48
Pathways	21
Total 122 divided by 3 =	41
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Pract. s Factor = Final Score

41 x 1.0 = 41

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 1, Base Landfill

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Industrial, domestic

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	1	6	6	18
			Subtotals	61	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 34

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--'
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	28	108
Subscore (100 x factor score subtotal/maximum score subtotal)				26
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	34
Waste Characteristics	40
Pathways	28
Total 102 divided by 3 =	34
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

34 x 1.0 = 34

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 2, Base Landfill

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Industrial, domestic

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	1	6	6	18
			Subtotals	61	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 34

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	2	8	16	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	28	108
Subscore (100 x factor score subtotal/maximum score subtotal)				26
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	34
Waste Characteristics	40
Pathways	28
Total 102 divided by 3 =	34
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

34 x 1.0 = 34

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 6, Radioactive Waste Pits

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: --

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	1	6	6	18
			Subtotals	61	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 34

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) S
2. Confidence level (C = confirmed, S = suspected) S
3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 30

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

30 x 1.0 = 30

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

30 x 1.0 = 30

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	2	6	12	18
Rainfall intensity	0	8	0	24
		Subtotals	20	108
Subscore (100 x factor score subtotal/maximum score subtotal)				19
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	2	8	16	24
		Subtotals	32	114
Subscore (100 x factor score subtotal/maximum score subtotal)				28
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		28

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	34
Waste Characteristics	30
Pathways	28
Total 92 divided by 3 =	31
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

31 x 1.0 = 31

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 1, Field Landfill

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: Industrial, domestic fill

SITE RATED BY: Michael Kemp

I. RECEPTORS

	Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	0	4	0	12
B.	Distance to nearest well	1	10	10	30
C.	Land use/zoning within 1 mile radius	0	3	0	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	73	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 41

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	--
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	1	8	8	24
Surface permeability	1	6	6	18
Rainfall intensity	0	8	0	24
		Subtotals	14	108
Subscore (100 x factor score subtotal/maximum score subtotal)				13
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
		Pathways Subscore		21

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	41
Waste Characteristics	40
Pathways	21
Total 102 divided by 3 =	34
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

34 x 1.0 = 34

HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE: No. 5, Fire Training Area

LOCATION: Nellis AFB, NV

DATE OF OPERATION OR OCCURRENCE: --

OWNER/OPERATOR: Nellis AFB, NV

COMMENTS/DESCRIPTION: POL, solvent burning

SITE RATED BY: Michael Kemp

I. RECEPTORS

Rating Factor		Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A.	Population within 1,000 feet of site	1	4	4	12
B.	Distance to nearest well	3	10	30	30
C.	Land use/zoning within 1 mile radius	20	3	6	9
D.	Distance to reservation boundary	3	6	18	18
E.	Critical environments within 1 mile radius of site	0	10	0	30
F.	Water quality of nearest surface-water body	0	6	0	18
G.	Ground-water use of uppermost aquifer	3	9	27	27
H.	Population served by surface-water supply within 3 miles downstream of site	0	6	0	18
I.	Population served by ground-water supply within 3 miles of site	3	6	18	18
			Subtotals	103	180

Receptors subscore (100 x factor score subtotal/maximum subtotal) 57

II. WASTE CHARACTERISTICS

A. Select the factor score based on the estimated quantity, the degree of hazard, and the confidence level of the information.

1. Waste quantity (S = small, M = medium, L = large) M

2. Confidence level (C = confirmed, S = suspected) S

3. Hazard rating (H = high, M = medium, L = low) M

Factor Subscore A (from 20 to 100 based on factor score matrix) 40

B. Apply persistence factor
Factor Subscore A x Persistence Factor = Subscore B

40 x 1.0 = 40

C. Apply physical state multiplier

Subscore B x Physical State Multiplier = Waste Characteristics Subscore

40 x 1.0 = 40

III. PATHWAYS

Rating Factor	Factor Rating (0-3)	Multiplier	Factor Score	Maximum Possible Score
A. If there is evidence of migration of hazardous contaminants, assign maximum factor subscore of 100 points for direct evidence or 80 points for indirect evidence. If direct evidence exists then proceed to C. If no evidence or indirect evidence exists, proceed to B.				
			Subscore	0
B. Rate the migration potential for three potential pathways: surface-water migration, flooding, and ground-water migration. Select the highest rating, and proceed to C.				
1. Surface-water migration				
Distance to nearest surface water	0	8	0	24
Net precipitation	0	6	0	18
Surface erosion	2	8	16	24
Surface permeability	1	6	6	18
Rainfall intensity	0	8	0	24
		Subtotals	22	108
Subscore (100 x factor score subtotal/maximum score subtotal)				20
2. Flooding	0	1	0	100
		Subscore (100 x factor score/3)		0
3. Ground-water migration				
Depth to ground water	1	8	8	24
Net precipitation	0	6	0	18
Soil permeability	1	8	8	24
Subsurface flows	0	8	0	24
Direct access to ground water	1	8	8	24
		Subtotals	24	114
Subscore (100 x factor score subtotal/maximum score subtotal)				21
C. Highest pathway subscore				
Enter the highest subscore value from A, B-1, B-2, or B-3 above.				
			Pathways Subscore	21

IV. WASTE MANAGEMENT PRACTICES

A. Average the three subscores for receptors, waste characteristics, and pathways.

Receptors	57
Waste Characteristics	40
Pathways	21
Total 118 divided by 3 =	39
	Gross Total Score

B. Apply factor for waste containment from waste management practices

Gross Total Score x Waste Management Practices Factor = Final Score

39 x 1.0 = 39